

Basic Phrase Based Decoding

1.0

Generated by Doxygen 1.8.10

Mon Mar 14 2016 12:49:06

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Chapter 1

README

***The Basic Phrase-Based Statistical Machine Translation Tool**

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Project pages: [Git-Hub-Project](#)

Introduction

This is a fork project from the Back Off Language Model(s) for SMT project aimed at creating the entire phrase-based SMT translation infrastructure. This project follows a client/server architecture based on Web Sockets for C++ and consists of the three main applications:

- **bpbd-client** - is a thin client to send the translation job requests to the translation server and obtain results
- **bpbd-server** - the the translation server consisting of the following main components:
 - *Decoder* - the decoder component responsible for translating text from one language into another
 - *LM* - the language model implementation allowing for seven different trie implementations and responsible for estimating the target language phrase probabilities.
 - *TM* - the translation model implementation required for providing source to target language phrase translation and the probabilities thereof.
 - *RM* - the reordering model implementation required for providing the possible translation order changes and the probabilities thereof
- **lm-query** - a stand-alone language model query tool that allows to perform language model queries and estimate the joint phrase probabilities.

To keep a clear view of the used terminology further we will provide some details on the phrase based statistical machine translation as given on the picture below, taken from [TAUS MT SHOWCASE slides](#).

The entire phrase-based statistical machine translation is based on learned statistical correlations between words and phrases of an example translation text, also called parallel corpus or corpora. Clearly, if the training corpora is large enough then it allows to cover most source/target language words and phrases and shall have enough information for approximating a translation of an arbitrary text. However, before this information can be extracted, the parallel corpora undergoes the process called *word alignment* which is aimed at estimating which words/phrases in the source language correspond to which words/phrases in the target language. As a result, we obtain two statistical models:

1. The Translation model - providing phrases in the source language with learned possible target language translations and the probabilities thereof.
2. The Reordering model - storing information about probable translation orders of the phrases within the source text, based on the observed source and target phrases and alignment thereof.

The last model, possibly learned from a different corpus in a target language, is the Language model. Its purpose is to reflect the likelihood of this or that phrase in the target language to occur. In other words it is used to evaluate the obtained translation for being *sound* in the target language.

With these three models at hand one can perform decoding, which is a synonym to a translation process. $S \leftrightarrow$ MT decoding is performed by exploring the state space of all possible translations and reordering of the source language phrases within one sentence and then looking for the most probable translations, as indicated at the bottom part of the picture above.

The rest of the document is organized as follows:

1. [Project structure](#) - Gives the file and folder structure of the project
2. [Supported platforms](#) - Indicates the project supported platforms
3. [Building the project](#) - Describes the process of building the project
4. [Using software](#) - Explain how the software is to be used
5. [Input file formats](#) - Provides examples of the input file formats
6. [Code documentation](#) - Refers to the project documentation
7. [External libraries](#) - Lists the included external libraries
8. [Performance evaluation](#) - Contains performance evaluation results
9. [General design](#) - Outlines the general software design
10. [Software details](#) - Goes about some of the software details
11. [Literature and references](#) - Presents the list of used literature
12. [Licensing](#) - States the licensing strategy of the project
13. [History](#) - Stores a short history of this document

Project structure

This is a Netbeans 8.0.2 project, based on cmake, and its top-level structure is as follows:

- ****[Project-Folder]**/**
 - **docs/** - contains the project-related documents including the Doxygen-generated code documentation and images
 - **ext/** - stores the external header only libraries used in the project
 - **inc/** - stores the C++ header files of the implementation
 - **src/** - stores the C++ source files of the implementation
 - **nbproject/** - stores the Netbeans project data, such as makefiles
 - **data/** - stores the test-related data such as test models and query input files, as well as some experimental results
 - **default.cfg** - an example server configuration file
 - **LICENSE** - the code license (GPL 2.0)
 - **CMakeLists.txt** - the cmake build script for generating the project's make files
 - [README.md](#) - this document
 - **Doxyfile** - the Doxygen configuration file

Supported platforms

This project supports two major platforms: Linux and Mac Os X. It has been successfully build and tested on:

- **Centos 6.6 64-bit** - Complete functionality.
- **Ubuntu 15.04 64-bit** - Complete functionality.
- **Mac OS X Yosemite 10.10 64-bit** - Limited by inability to collect memory-usage statistics.

Notes:

1. There was only a limited testing performed on 32-bit systems.
2. The project must be possible to build on Windows platform under [Cygwin](#).

Building the project

Building this project requires **gcc** version $\geq 4.9.1$ and **cmake** version $\geq 2.8.12.2$.

The first two steps before building the project, to be performed from the Linux command line console, are:

- `cd [Project-Folder]`
- `mkdir build`

Further the project can be build in two ways:

- From the Netbeans environment by running Build in the IDE
 - In Netbeans menu: `Tools/Options/"C/C++"` make sure that the `cmake` executable is properly set.
 - Netbeans will always run `cmake` for the `DEBUG` version of the project
 - To build project in `RELEASE` version use building from Linux console
- From the Linux command-line console by following the next steps
 - `cd [Project-Folder]/build`
 - `cmake -DCMAKE_BUILD_TYPE=Release ..` OR `cmake -DCMAKE_BUILD_TYPE=Debug ..`
 - `make -j [NUMBER-OF-THREADS] add VERBOSE=1` to make the compile-time options visible

The binaries will be generated and placed into `*/build/*` folder. In order to clean the project from the command line run `make clean`. Cleaning from Netbeans is as simple calling the `Clean` and `Build` from the `Run` menu.

Project compile-time parameters

For the sake of performance optimizations, the project has a number of compile-time parameters that are to be set before the project is build and can not be modified in the runtime. Let us consider the most important of them and indicate where all of them are to be found.

Logging level: Logging is important when debugging software or providing an additional user information during the program's runtime. Yet additional output actions come at a price and can negatively influence the program's performance. This is why it is important to be able to disable certain logging levels within the program not only during its runtime but also at compile time. The possible range of project's logging levels, listed incrementally, is: `ERROR`, `WARNING`, `USAGE`, `RESULT`, `INFO`, `INFO1`, `INFO2`, `INFO3`, `DEBUG`, `DEBUG1`, `DEBUG2`, `DEBUG3`,

DEBUG4. One can limit the logging level range available at runtime by setting the `LOGGER_M_GRAM_LEVEL_MAX` constant value in the `./inc/common/utils/logging/logger.hpp` header file. The default value is INFO3.

Sanity checks: When program is not running as expected, it could be caused by the internal software errors that are potentially detectable at runtime. This software has a number of build-in sanity checks that can be enabled/disabled at compile time by setting the `DO_SANITY_CHECKS` boolean flag in the `./inc/common/utils/exceptions.hpp` header file. Note that enabling the sanity checks does not guarantee that the internal error will be found but will have a negative effect on the program's performance. Yet, it might help to identify some of the errors with e.g. input file formats and alike.

Server configs: There is a number of translation server common parameters used in decoding, translation, re-ordering and language models. Those are to be found in the `./inc/server/server_configs.hpp`:

- `UNKNOWN_LOG_PROB_WEIGHT` - The value used for the unknown probability weight `_(log10 scale)_`
- `ZERO_LOG_PROB_WEIGHT` - The value used for the 'zero' probability weight `_(log10 scale)_`
- `tm::NUM_TM_FEATURES` - The number of the translation model features, which defines the exact number of features read per entry from the translation model input file
- `tm::TM_MAX_TARGET_PHRASE_LEN` - The maximum length of the target phrase to be considered, this defines the maximum number of tokens to be stored per translation entry
- `lm::NUM_LM_FEATURES` - The number of language model features, the program currently supports only one value: 1
- `lm::LM_M_GRAM_LEVEL_MAX` - The language model maximum level, the maximum number of words in the language model phrase
- `lm::LM_HISTORY_LEN_MAX` - **do not change** this parameter
- `lm::LM_MAX_QUERY_LEN` - **do not change** this parameter
- `lm::DEF_UNK_WORD_LOG_PROB_WEIGHT` - The default unknown word probability weight, for the case the `<unk>` entry is not present in the language model file `_(log10 scale)_`
- `rm::NUM_RM_FEATURES` - The number of reordering model features, the only two currently supported values are: 6 and 8

Decoder configs: The decoder-specific parameters are located in `./inc/server/decoder/de_configs.hpp`:

- `MAX_WORDS_PER_SENTENCE` - The maximum allowed number of words/tokens per sentence to translate.

LM configs: The Language-model-specific parameters located in `./inc/server/lm/lm_configs.hpp`:

- `lm_word_index` - the word index type to be used, the possible values are:
 - `basic_word_index` - the basic word index that just loads the uni-grams in the same order as in the LM model file and gives them consecutive id values.
 - `counting_word_index` - the basic word index that counts the number of times the uni-gram occurs in the LM model file and gives lower ids to the more frequent uni-grams. This ensures some performance boost (within 10%) when querying certain types of language models but requires longer loading times.
 - `optimizing_word_index<basic_word_index>` - the optimizing word index is based on the linear probing hash map so it is the fastest, it uses a basic word index as a bootstrap word index for issuing the ids.
 - `optimizing_word_index<counting_word_index>` - the optimizing word index is based on the linear probing hash map so it is the fastest, it uses a counting word index as a bootstrap word index for issuing the ids.

- `hashing_word_index` - the hashing word index is a discontinuous word index that does not issue the uni-gram ids consequently but rather associates each uni-gram with its hash value, the latter is taken to be a unique identifier. This is the only type of index supported by the hash-based `h2d_map_trie`.
- `lm_model_type` - the trie model type to be used, the possible values (trie types) are as follows, for a performance comparison thereof see [Performance Evaluation](#):
 - `c2d_hybrid_trie<lm_word_index>` - contains the context-to-data mapping trie implementation based on `std::unordered map` and ordered arrays
 - `c2d_map_trie<lm_word_index>` - contains the context-to-data mapping trie implementation based on `std::unordered map`
 - `c2w_array_trie<lm_word_index>` - contains the context-to-word mapping trie implementation based on ordered arrays
 - `g2d_map_trie<lm_word_index>` - contains the m-gram-to-data mapping trie implementation based on self-made hash maps
 - `h2d_map_trie<lm_word_index>` - contains the hash-to-data mapping trie based on the linear probing hash map implementation
 - `w2c_array_trie<lm_word_index>` - contains the word-to-context mapping trie implementation based on ordered arrays
 - `w2c_hybrid_trie<lm_word_index>` - contains the word-to-context mapping trie implementation based on `std::unordered map` and ordered arrays
- `lm_model_reader` - the model reader is basically the file reader type one can use to load the model, currently there are three model reader types available, with `cstyle_file_reader` being the default:
 - `file_stream_reader` - uses the C++ streams to read from files, the slowest
 - `cstyle_file_reader` - uses C-style file reading functions, faster than `file_stream_reader`
 - `memory_mapped_file_reader` - uses memory-mapped files which are faster than the `cstyle_file_reader` but consume twice the file size memory (virtual RAM).
- `lm_builder_type` - currently there is just one builder type available: `lm_basic_builder<lm_model_reader>`.

Note that not all of the combinations of the `lm_word_index` and `lm_model_type` can work together, this is reported runtime after the program is build. Some additional details on the preferred configurations can be also found in the `./inc/server/lm/lm_consts.hpp` header file comments. The default, and the most optimal performance/memory ratio configuration, is:

- `lm_word_index` being set to `hashing_word_index`
- `lm_model_type` begin set to `h2d_map_trie<lm_word_index>`.

TM configs: The Translation-model-specific parameters are located in `./inc/server/tm/tm_configs.hpp`:

- `tm_model_type` - currently there is just one model type available: `tm_basic_model`
- `tm_model_reader` - the same as `lm_model_reader` for `"LM configs"`, see above
- `tm_builder_type` - currently there is just one builder type available: `tm_basic_builder<tm_model_reader>`

RM configs: The Reordering-model-specific parameters are located in `./inc/server/rm/rm_configs.hpp`:

- `rm_model_type` - currently there is just one model type available: `rm_basic_model`
- `rm_model_reader` - the same as `lm_model_reader` for `"LM configs"`, see above
- `rm_builder_type` - currently there is just one builder type available: `rm_basic_builder<rm_model_reader>`

Using software

This section briefly covers how the provided software can be used for performing text translations. We begin with the **bpbd-server** and the **bpbd-client** then briefly talk about the **lm-query**. For information on the LM, TM and RM model file formats and others see section [Input file formats](#)

Translation server: *bpbd-server*

The translation server is used to load language, translation and reordering models for a given source/target language pair and to process the translation requests coming from the translation client. When started from a command line without any parameters, **bpbd-server** reports on the available command-line options:

```
1 $ bpbd-server
2 <...>
3 PARSE ERROR:
4         Required argument missing: config
5
6 Brief USAGE:
7 bpbd-server [-d <error|warn|usage|result|info|info1|info2|info3>] -c
8             <server configuration file> [--] [--version] [-h]
9
10 For complete USAGE and HELP type:
11 bpbd-server --help
```

There are to complementing ways to configure the **bpbd-server**, the first one is the *configuration file* and another is the *server console*. We consider both of them below in more details.

Configuration file

In order to start the server one must have a valid configuration file for it. The latter stores the minimum set of parameter values needed to run the translation server. Among other things, this config file specifies the location of the language, translation and reordering models, the number of translation threads, and the web socket port through which the server will accept requests. An example configuration file can be found in: [Project-Folder]/default.cfg and in [Project-Folder]/data. The content of this file is self explanatory and contains a significant amount of comments.

When run with a properly formed configuration file, **bpbd-server** gives the following output. Note the `-d info1` option ensuring additional information output during loading the models.

```
1 $ bpbd-server -c ../data/default-1-3.000.000.cfg -d info1
2 <...>
3 USAGE: The requested debug level is: 'INFO1', the maximum build level is 'INFO3' the set level is 'INFO1'
4 USAGE: Loading the server configuration option from: ../data/default-1-3.000.000.cfg
5 USAGE: Translation server from 'German' into 'English' on port: '9002' translation threads: '25'
6 INFO: LM parameters: [ conn_string = ../data/models/e_30_2564372.lm, num_lm_feature_weights = 1,
7   lm_feature_weights = [ 1 ] ]
8 INFO: TM parameters: [ conn_string = ../data/models/de-en-1-3.000.000.tm, num_tm_feature_weights = 4,
9   tm_feature_weights = [ 1|1|1|1 ] , translation_limit = 30, min_trans_prob = 1e-20 ]
10 INFO: RM parameters: [ conn_string = ../data/models/de-en-1-3.000.000.rm, num_rm_feature_weights = 6,
11   rm_feature_weights = [ 1|1|1|1|1|1 ] ]
12 INFO: DE parameters: [ distortion = 5, ext_dist_left = 1, num_best_trans = 10, pruning_threshold = 1.1,
13   stack_capacity = 100, word_penalty = -0.3, phrase_penalty = 1.2, max_source_phrase_len = 7,
14   max_target_phrase_len = 7 ]
15 USAGE: -----
16 USAGE: Start creating and loading the Language Model ...
17 USAGE: Language Model is located in: ../data/models/e_30_2564372.lm
18 USAGE: Using the <cstyle_file_reader.hpp> file reader!
19 USAGE: Using the <h2d_map_trie.hpp> model.
20 INFO: The <h2d_map_trie.hpp> model's buckets factor: 2
21 INFO: Expected number of M-grams per level: [ 199164 4202658 15300577 26097321 31952150 ]
22 INFO1: Pre-allocating memory: 0 hour(s) 0 minute(s) 0 second(s)
23 INFO1: Reading ARPA 1-Grams: 0 hour(s) 0 minute(s) 0 second(s)
24 INFO1: Reading ARPA 2-Grams: 0 hour(s) 0 minute(s) 5 second(s)
25 INFO1: Reading ARPA 3-Grams: 0 hour(s) 0 minute(s) 27 second(s)
26 INFO1: Reading ARPA 4-Grams: 0 hour(s) 0 minute(s) 56 second(s)
27 INFO1: Reading ARPA 5-Grams: 0 hour(s) 1 minute(s) 16 second(s)
28 USAGE: Reading the Language Model took 170.276 CPU seconds.
29 USAGE: Action: 'Loading the Language Model' memory change:
30 USAGE: vmsize=+1770 Mb, vmpeak=+1770 Mb, vmrss=+1771 Mb, vmhwm=+1771 Mb
31 USAGE: -----
32 USAGE: Start creating and loading the Translation Model ...
33 USAGE: Translation Model is located in: ../data/models/de-en-1-3.000.000.tm
34 USAGE: Using the <cstyle_file_reader.hpp> file reader!
```

```

30 USAGE: Using the hash-based translation model: tm_basic_model.hpp
31 INFO: Counting phrase translations: 0 hour(s) 0 minute(s) 10 second(s)
32 INFO: The number of valid TM source entries is: 1620524
33 INFO: Building translation model: 0 hour(s) 0 minute(s) 43 second(s)
34 USAGE: Reading the Translation Model took 58.8196 CPU seconds.
35 USAGE: Action: 'Loading the Translation Model' memory change:
36 USAGE: vmsize=+550 Mb, vmpeak=+550 Mb, vmrss=+550 Mb, vmhwm=+550 Mb
37 USAGE: -----
38 USAGE: Start creating and loading the Reordering Model ...
39 USAGE: Reordering Model is located in: ../data/models/de-en-1-3.000.000.rm
40 USAGE: Using the <cstyle_file_reader.hpp> file reader!
41 USAGE: Using the hash-based reordering model: rm_basic_model.hpp
42 INFO: Counting reordering entries: 0 hour(s) 0 minute(s) 6 second(s)
43 INFO: The number of RM source/target entries matching TM is: 2567397
44 INFO: Building reordering model: 0 hour(s) 0 minute(s) 12 second(s)
45 USAGE: Reading the Reordering Model took 21.6754 CPU seconds.
46 USAGE: Action: 'Loading the Reordering Model' memory change:
47 USAGE: vmsize=+78 Mb, vmpeak=+61 Mb, vmrss=+78 Mb, vmhwm=+61 Mb
48 USAGE: The server is started!
49 <...>

```

In the first seven lines we see information loaded from the configuration file. Further, the LM, TM, and RM, models are loaded and the information thereof is provided. Note that for less output one can simply run `bpbd-server -c ../data/default-1-3.000.000.cfg`.

There is a few important things to note about the configuration file at the moment:

- [Translation Models]/tm_feature_weights - the number of features must be equal to the value of `tm::NUM_TM_FEATURES`, see [Project compile-time parameters](#).
- [Translation Models]/tm_unk_features - the number of features must be equal to the value of `tm::NUM_TM_FEATURES`, see [Project compile-time parameters](#).
- [Reordering Models]/rm_feature_weights - the number of features must be equal to the value of `lm::NUM_RM_FEATURES`, see [Project compile-time parameters](#).
- [Language Models]/lm_feature_weights - the number of features must be equal to the value of `lm::NUM_LM_FEATURES`, see [Project compile-time parameters](#).

Server console

Once the server is started it is not run as a Linux daemon but is a simple multi-threaded application that has its own interactive console allowing to manage some of the configuration file parameters and obtain some run-time information about the server. The list of available server console commands is given in the listing below:

```

1 $ bpbd-server -c ../data/default-1-3.000.000.cfg -d info2
2 <...>
3 USAGE: The server is started!
4 USAGE: Available server commands:
5 USAGE: 'q & <enter>' - to exit.
6 USAGE: 'h & <enter>' - print HELP info.
7 USAGE: 'r & <enter>' - run-time statistics.
8 USAGE: 'p & <enter>' - print server parameters.
9 USAGE: 'set ll <level> & <enter>' - set log level.
10 USAGE: 'set nt <positive integer> & <enter>' - set the number of worker threads.
11 USAGE: 'set nbt <unsigned integer> & <enter>' - set the number of best translations.
12 USAGE: 'set d <integer> & <enter>' - set the distortion limit.
13 USAGE: 'set edl <unsigned integer> & <enter>' - set the extra left distortion.
14 USAGE: 'set pt <unsigned float> & <enter>' - set pruning threshold.
15 USAGE: 'set sc <integer> & <enter>' - set stack capacity.
16 USAGE: 'set wp <float> & <enter>' - set word penalty.
17 USAGE: 'set pp <float> & <enter>' - set phrase penalty.
18 >>

```

Note that, the commands allowing to change the translation process, e.g. the stack capacity, are to be used with great care. For the sake of memory optimization, **bpbd-server** has just one copy of the server runtime parameters used from all the translation processes. So in case of active translation process, changing these parameters can cause disruptions thereof starting from an inability to perform translation and ending with memory leaks. All newly scheduled or finished translation tasks however will not experience any disruptions.

Translation client: *bpbd-client*

The translation client is used to communicate with the server by sending translation job requests and receiving the translation results. When started from a command line without any parameters, **bpbd-client** reports on the available command-line options:

```

1 $bpbd-client
2 <...>
3 PARSE ERROR:
4     Required arguments missing: output-file, input-lang, input-file
5
6 Brief USAGE:
7     bpbd-client  [-d <error|warn|usage|result|info|info1|info2|info3>] [-t]
8                  [-l <min #sentences per request>] [-u <max #sentences per
9                  request>] [-p <server port>] [-s <server address>] [-o
10                     <target language>] -O <target file name> -i <source
11                     language> -I <source file name> [--] [--version] [-h]
12
13 For complete USAGE and HELP type:
14     bpbd-client --help

```

The translation client makes a web socket connection to the translation server, reads text from the input file and splits it into a number of translation job requests which are sent to the translation server. Note that, the input file is expected to have one source language sentence per line. The client has a basic algorithm for tokenising strings and putting them into the lower case, i.e. preparing the text for translation. Each translation job sent to the server consists of a number of sentences called translation tasks. The maximum and minimum number of translation tasks per a translation job is configurable via additional client parameters. For more info run: `bpbd-client --help`.

Once the translations are performed the resulting text is written to the output file. Each translated sentence is put on a separate line in the same order it was seen in the input file. Each line is prefixed with a translation status having a form: `<status>`. If a translation task was cancelled, or an error has occurred then it is indicated by the status and the information about that is also placed in the output file on the corresponding sentence line.

As always, running **bpbd-client** with higher logging levels will give more insight into the translation process and functioning of the client. It is also important to note that, the source-language text in the input file is required to be in the utf8 encoding.

Language model query tool: *lm-query*

The language model query tool is used for querying stand alone language models to obtain the joint m-gram probabilities. When started from a command line without any parameters, **lm-query** reports on the available command-line options:

```

1 $ lm-query
2 <...>
3 PARSE ERROR:
4     Required arguments missing: query, model
5
6 Brief USAGE:
7     lm-query  [-l <lm lambda weight>] [-d <error|warn|usage|result|info
8                  |info1|info2|info3>] -q <query file name> -m <model file name>
9                  [--] [--version] [-h]
10
11 For complete USAGE and HELP type:
12     lm-query --help

```

The language query tool has not changed much since the split-off from its official repository [Back Off Language Model SMT](#). The tool's input file formats have not changed either, except for what is mentioned below. The main tool's changes are:

- Now it is not possible to have just a single m-gram probability query. The tool always computes the joint probability of all the m-grams in the query starting from 1 up to N and then with a sliding window of the N-grams where N is the maximum language model level. However, the information over the intermediate single m-gram probabilities is still provided in the tool's output.
- The length of the LM query is not limited by the maximum language model level N but is limited by a compile-time constant `lm::LM_MAX_QUERY_LEN`, see [Project compile-time parameters](#).

Input file formats

In this section we briefly discuss the model file formats supported by the tools. We shall occasionally reference the other tools supporting the same file formats and external third-party web pages with extended format descriptions.

Translation model: *.tm

The translation-model file stores the phrase pairs in the source and target languages and the pre-computed probability weights in the following strict format:

```
1 <source-phrase> ||| <target-phrase> ||| <prob-1> <prob-2> <prob-3> <prob-4>
```

As generated by, e.g. [Moses](#). In general the source and target phrases and target phrase and probability weight sections are separated by five symbols: one space three vertical lines and one space. Source and target space words must be space separated, as well as the probability weights. At the moment, everything followed after the fourth probability, until the end of the line, is ignored. The tool supports 4 translation probabilities and the supported number of weights is defined by the `tm::NUM_TM_FEATURES` constant value, see [Project compile-time parameters](#). If the format is not followed, the program's behavior is not specified.

Reordering model: *.rm

The reordering-model file stores the phrase pairs in the source and target languages and the reordering weights in the following strict format:

```
1 <source-phrase> ||| <target-phrase> ||| <weight-1> <weight-2> ... <weight-k>
```

As generated by, e.g. [Moses](#). In general the source and target phrases and target phrase and probability weight sections are separated by five symbols: one space three vertical lines and one space. Source and target space words must be space separated, as well as the probability weights. At the moment, everything followed after the last probability, until the end of the line, is ignored. The number weights `k` is fixed per model file. The tool supports 6 or 8 reordering weights and the supported number of weights is defined by the `rm::NUM_RM_FEATURES` constant value, see [Project compile-time parameters](#). If the format is not followed, the program's behavior is not specified.

Language model: *.lm

The language model file is a UTF8 text file in a well known ARPA format, see e.g. details on [MSDN help](#) or [Speech Technology and Research \(STAR\) Laboratory](#). An example ARPA file is given below:

```
1 <header - information ignored by applications>
2
3 \data\
4 ngram 1=9
5 ngram 2=11
6 ngram 3=3
7
8 \1-grams:
9 -0.8953 <unk> -0.7373
10 -0.7404 </s> -0.6515
11 -0.7861 <s> -0.1764
12 -1.0414 When -0.4754
13 -1.0414 will -0.1315
14 -0.9622 the 0.0080
15 -1.4393 Stock -0.3100
16 -1.0414 Go -0.3852
17 -0.9622 Up -0.1286
18
19 \2-grams:
20 -0.3626 <s> When 0.1736
21 -1.2765 <s> the 0.0000
22 -1.2765 <s> Up 0.0000
23 -0.2359 When will 0.1011
24 -1.0212 will </s> 0.0000
25 -0.4191 will the 0.0000
```

```

26 -1.1004 the </s>      0.0000
27 -1.1004 the Go       0.0000
28 -0.6232 Stock Go     0.0000
29 -0.2359 Go Up        0.0587
30 -0.4983 Up </s>
31
32 \3-grams:
33 -0.4260 <s> When will
34 -0.6601 When will the
35 -0.6601 Go Up </s>
36
37 \end\

```

Note that the format is expected to be followed in a very strict way. The headers can be skipped, the empty lines must be empty, the M-gram entry:

```
1 <probability>    <word-1> <word-2> ... <word-m>    <back-off-weight>
```

Must have one *tabulation* symbol after the `<probability>`, single space between any two words, and a single *tabulation* symbol before the `<back-off-weight>`. If the format is not followed, the program's behavior is not specified. The maximum allowed language model level, the maximum value of N in the N-gram, is defined by the compile-time parameter `lm: :LM_M_GRAM_LEVEL_MAX`, see [Project compile-time parameters](#).

Code documentation

At present the documentation is done in the Java-Doc style that is successfully accepted by Doxygen with the Doxygen option `JAVADOC_AUTOBRIEF` set to `YES`. The generated documentation is located in two folders:

- `[Project-Folder]/docs/html`
 - Open the *index.html* file located in this folder with your favorite web browser.
- `[Project-Folder]/docs/latex`
 - Open the *refman.pdf* file located in this folder with your favorite pdf viewer.

The `[Project-Folder]/Doxyfile` can be used to re-generate the documentation at any given time, for more details see [Doxygen](#).

- To re-build the Latex documentation run the following commands from the Linux console:
 - `cd [Project-Folder]/docs/latex`
 - `make`

External libraries

At present this project uses the following external/third-party header-only libraries:

Library Name	Purpose	Website	Version	Licence
Feather ini parser	_Fast, lightweight, header, portable INI/configuration file parser for ANSI C++._	link	1.40	MIT

WebSocket++	_Is an open source, header only C++ library implementing RFC6455 (The WebSocket Protocol)._ _	link	0.6.0	BSD
Asio C++ Library	_A cross-platform C++ library for network and low-level I/O programming_ _	link	1.10.6	Boost
Tclap	_A small and flexible library that provides a simple interface for defining and accessing command line arguments_ _	link	1.2.1	MIT

Performance evaluation

In this section we provide an empirical comparison of the developed LM query tool with two other well known tools, namely [SRILM](#) and [KenLM](#), both of which provide language model implementations that can be queried. The additional information on the compared tools is to be found in [Appendix Tests](#)

Test set-up

The main target of this experimental comparison is to evaluate memory consumption and query times of the implemented tries. For doing that we do not rely on the time and memory statistics reported by the tools but rather, for the sake of uniform and independent opinion, rely on the Linux standard time utility available in the `zsh` Linux shell. The latter provides system-measured statistics about the program run. We choose to measure:

- **MRSS** - the maximum resident memory usage of the program
- **CPU time** - the CPU time in seconds

We chose to measure maximum resident memory usage as this is what defines the amount of RAM needed to run the program. Also, the CPU times are the actual times that the program was executed on the CPU. Measuring CPU times allows for a fair comparison as excludes possible results influence by the other system processes.

The experiments were set up to be run with different-size 5-gram language models given in the ARPA format with two types of inputs:

1. The single 5-gram query that defines the baseline
2. The file input with 100,000,000 of 5-gram queries

The delta in execution CPU times between the baseline and the 100,000,000 query files defines the pure query execution time of the tool. Note that, the query files were produced from the text corpus different from the one used to produce the considered language models. The MRSS values are reported in gigabytes (Gb) and the CPU times are measured in seconds. The plots provide MRSS and CPU times relative to the input model size in Gb.

The test hardware configuration and the model/query files' data is to be found in [Appendix Tests](#)

Experimental results

The experimental results are present in the following two pictures. The first one indicates the changes in the MRSS depending on the model size:

The second one shows the query CPU times depending on the model sizes:

The results show that the developed LM model trie representations are highly compatible with the available state of the art tools. We also give the following usage guidelines for the implemented tries:

- **w2ca** and **c2wa** tries are beneficial for the machines with limited RAM. If low memory usage is very critical then bitmap hash caching can also be disabled.
- **c2dm** trie provides the fastest performance with moderate memory consumption. This is recommended when high performance is needed but one should be aware of possible m-gram id collisions.¹⁰
- **c2dh** trie is preferable if performance, as well as moderate memory consumption, is needed. This is the second-fastest trie which, unlike **c2dm**, is fully reliable.
- **w2ch** trie did not show itself useful and **g2dm** is yet to be re-worked and improved for better performance and memory usage.
- **h2dm** following the intuitions of the KenLM implementation, realizes the hash-map based trie using the linear probing hash map which turns to be the fastest trie with one of the best memory consumption. This tries type is used as a default one

General design

This section describes the ultimate and the current designs of the provided software. Note that the designs below are schematic only and the actual implementation might deviate. Yet, they are sufficient to reflect the overall structure of the software. We first provide the ultimate design we are going to work for and then give some insights into the currently implemented version thereof. The designs were created using [Unified Modeling Language \(UML\)](#) with the help of the online UML tool called [UMLetino](#).

The ultimate design

Consider the deployment diagram below. It shows the ultimate design we are aiming at.

This design's main feature is that it is fully distributed, and consists of three, vertical, layers.

1. *The first layer*, located on the left side, is the front desk-load balancing piece of software who's responsibility is receiving the translation job requests from one language to another and then forwarding them to the second layer of the design performing load balancing.
2. *The second layer*, located in the middle of the picture, is a number of decoding servers that perform translation jobs. These servers can run decoders performing one-to-one language translation each, and there may be multiple instances of decoders for the same source/target language pair. Alternatively, each decoder might be able to translate from a bunch of languages into a bunch of languages and all the middle level server instances run multiple copies of such decoders. Of course an intermediate variant is also possible.
3. *The third layer*, located on the right side, is the layer of various instances of the Language, Translation, and Reordering models. Once again, there can be multiple instances of the same model running to distribute the workload. Any decoder is free to use any and any number of model instances running in the third layer.

The communication between the layers here is suggested to be done using Web sockets as the fastest available asynchronous communication protocol available at the moment. In case of significant network communication overhead some of the system components can be run locally on the same physical computing unit or even be build into a monolith application for complete avoidance of the socket communications. The latter can be achieved by simply providing a local implementation of the needed system component. This approach is taken in the first version of the implemented software discussed in the next sub-section.

The current design

Due to the limited time and as a proof of concept, the first version of the project follows the simplified version of the ultimate design given by the deployment diagram below.

As one can notice, in this figure the first layer is removed, i.e. there is no load-balancing entity. Also the Language, Translation, and Reordering models have local interface implementations only and are compiled together with the decoder in a single application. One can easily extend this design towards the ultimate one by simply providing the remote implementations for the LM, TM and RM models using the existing libraries used in the current implementation.

Let us now briefly consider the two most complicated components of the software, the *Decoder* and the *Language model*.

The decoder component

The class diagram of the decoder component is given below. The decoder has a multi-threaded implementation, where each translation job (*a number of sentences to translate*) gets split into a number of translations tasks (*one task is one sentence*). Every translation task is executed in a separate thread. The number of translation threads is configurable at any moment of time.

Let us consider the main classes from the diagram:

The *Decoder Impl* is responsible for: receiving the Web socket session open and close requests; parsing the translation requests into translation jobs; scheduling the translation jobs to the *JobPool*; receiving the finished job notification; and sending the finished job reply to the client.

The *JobPool* stores all the scheduled translation jobs and splits them into the translation tasks scheduled by the *TaskPool*. Once all the translation tasks of a translation job are finished the *JobPool* notifies the *Decoder Impl*.

The *TaskPool* contains the queue of scheduled translation tasks and a limited number of translation worker threads to perform translations. In essence this is a thread pool entity with a queue of thread tasks.

The *TranslationTask* is a sentence translation entity, its responsibility is to retrieve the preliminary information from the Language, Translation, and Reordering models and then to perform translations using the translation multi- \leftrightarrow *_Stack_*, and instances of *Level* and *State* classes. The latter represents the translation expansion hypothesis. At present the translation algorithm supports:

- Beam search
- Future cost estimates
- Threshold pruning of hypothesis
- Histogram pruning of hypothesis
- Hypothesis recombination

The LM component

Let us now consider the LM implementation class/package diagram on the figure below:

The design of the Language model has not changed since the split off from the [Back Off Language Model SMT](#) project. So for more details we refer to the [Implementation Details](#) section of the [README.md](#) thereof. Please note that, recently the project class, file and folder names have changed slightly to become more uniform across the LM, TM, and RM implementations. The latter can be a minor source of confusion when relating this diagram back to the source code. Still, the overall conceptual design is remained intact and is reflected by the diagram in a perfect way.

Software details

In this section we provide some additional details on the structure of the provided software. We shall begin with the common packages and then move on to the binary specific ones. The discussion will not go into details and will be kept at the level of source file folder, explaining their content.

Note that, to the possible extend the software is implemented via the header files located in the `[Project-Folder]/inc`. Due to the C++ language restrictions some of the header files do have corresponding C++ source files located in `[Project-Folder]/src`. The latter, to the necessary extend, follows the structure and file names found in `[Project-Folder]/inc`. Therefore, further we will only concentrate on the content of the `[Project-Folder]/inc` folder.

Additional information about the source code implementation classes can be found in the project's [Code documentation](#).

common packages

The project's common packages are located in `[Project-Folder]/inc/common`:

- `/messaging` - web-socket message related classes common for the bpbdb server and client
- `/utils` - various utility classes and libraries needed for logging and etc.
 - `/containers` - some container type classes
 - `/file` - file-reading related classes
 - `/logging` - logging classes
 - `/monitor` - memory usage and CPU times monitor classes

bpbdb-client

All of the *bpbdb-client* specific implementation classes are located in `[Project-Folder]/inc/client`.

bpbdb-server

All of the *bpbdb-server* specific implementation classes are located in `[Project-Folder]/inc/server`:

- `/common` - classes common to all server components
 - `/models` - model-related classes common to all server components
- `/decoder` - classes used in the decoder component
 - `sentence` - classes related to the top-level sentence decoding algorithms
 - `stack` - the multi-stack classes related to the stack-based decoding algorithms
- `/tm` - the translation model classes
 - `builders` - the model builder classes needed for reading the models
 - `models` - the model representation classes
 - `proxy` - the proxy objects implementing the local and/or remote model interface
- `/rm` - the reordering model classes
 - The same as for `/tm`.
- `/lm` - the language model classes
 - Similar to `/tm` and `/rm` but has some differences, see the next sub-section.

lm-query

All of the *lm-query* specific implementation classes are located in `[Project-Folder]/inc/server/lm/`. The structure of this folder follows the general patterns of that of `[Project-Folder]/inc/server/tm/` and `[Project-Folder]/inc/server/rm/` but has the following additional sub-folders:

- `/dictionaries` - dictionary/word-index related classes
- `/mgrams` - model and query m-gram related classes.

Literature and references

This project is originally based on the following literature:

- Kenneth Heafield. "Kenlm: Faster and smaller language model queries." [BibTex](#)
- Philipp Koehn. "Statistical Machine Translation". [BibTex](#)
- Mark Jan Nederhof, Giorgio Satta. "Prefix Probability for Probabilistic Synchronous Context-Free Grammars" [BibTex](#)
- Adam Pauls, Dan Klein. "Faster and Smaller N-Gram Language Models" [BibTex](#)
- Daniel Robenek, Jan Platos, Vaclav Snasel. "Efficient In-memory Data Structures for n-grams Indexing" [BibTex](#)
- Andreas Stolcke, Jing Zheng, Wen Wang, Victor Abrash. "SRILM at Sixteen: Update and Outlook" [BibTex](#)
- Matthew Szudzik. "An Elegant Pairing Function" [BibTex](#)

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History

- **21.04.2015** - Created
- **27.07.2015** - Changed project name and some to-do's
- **21.09.2015** - Updated with the latest developments preparing for the version 1, Owl release.
- **11.03.2016** - Updated to reflect the latest project status.

Appendix Tests

SRILM

Is a toolkit for building and applying statistical language models (LMs), primarily for use in speech recognition, statistical tagging and segmentation, and machine translation. It has been under development in the SRI Speech Technology and Research Laboratory since 1995. The employed tool version is **1.7.0**. The tool is run with the following command-line options:

```
1 % ngram -lm model-file -order 5 -ppl queries-file \
2       -no-sos -no-eos -memuse -debug 0
```

No changes were done to the tool's source code.

KenLM

KenLM is a tool for estimating, filtering, and querying language models. The tool does not have clear version indication, so we used the tool's GitHub snapshot of the Git revision:

Of 306088c3d8b3a668c934f 605e21b693b959d4d

KenLM does not allow to switch off the probability reports from the command line. Therefore we had to modify the tool's code. In the `kenlm/lm/ngram query.hh` file we commented out the output code lines as follows:

```
1 struct BasicPrint {
2     void Word(StringPiece, WordIndex, const FullScoreReturn &) const {}
3     void Line(uint64_t oov, float total) const {
4         //std::cout << "Total: " << total << " OOV: " << oov << '\n';
5     }
6     void Summary(double, double, uint64_t, uint64_t) {}
7 };
8 struct FullPrint : public BasicPrint {
9     void Word(StringPiece surface, WordIndex vocab,
10              const FullScoreReturn &ret) const {
11         //std::cout << surface << '=' << vocab << ' '
12         //<< static_cast<unsigned int>(ret.ngram_length)
13         //<< ' ' << ret.prob << '\t';
14     }
15     void Summary(double ppl_including_oov, double ppl_excluding_oov,
16                  uint64_t corpus_oov, uint64_t corpus_tokens) {
17         std::cout <<
18             "Perplexity including OOVs:\t" << ppl_including_oov << "\n"
19             "Perplexity excluding OOVs:\t" << ppl_excluding_oov << "\n"
20             "OOVs:\t" << corpus_oov << "\n"
21             "Tokens:\t" << corpus_tokens << '\n'
22         ;
23     }
24 };
```

After this change, the tool was run with the following command-line options: 18

```
1 % query -n model-file < queries-file
```

Hardware configuration

The experiments were run on the following machine configuration:

```
1 [~ smt7 ~]$ lscpu
2 Architecture:          x86_64
3 CPU op-mode(s):        32-bit, 64-bit
4 Byte Order:             Little Endian
5 CPU(s):                 40
6 On-line CPU(s) list:   0-39
7 Thread(s) per core:     2
8 Core(s) per socket:     10
9 Socket(s):              2
10 NUMA node(s):          2
11 Vendor ID:              GenuineIntel
12 CPU family:             6
13 Model:                  62
14 Stepping:               4
15 CPU MHz:                1200.000
16 BogoMIPS:               4999.23
17 Virtualization:         VT-x
18 L1d cache:              32K
19 L1i cache:              32K
20 L2 cache:               256K
21 L3 cache:               25600K
22 NUMA node0 CPU(s):      0-9,20-29
23 NUMA node1 CPU(s):      10-19,30-39
24 [~ smt7 ~]$ lsb_release -irc
25 Distributor ID: CentOS
26 Release:                6.7
27 Codename:               Final
28 [~ smt7 ~]$ grep MemTotal /proc/meminfo
29 MemTotal:                264496688 kB
```

Language models and query files

The considered language models and their sizes (in bytes) are:

```
1 [~ smt10~]$ ls -al *.lm
2 -rw-r--r-- 1      937792965 Sep 21 15:55 e_10_641093.lm
3 -rw-r--r-- 1     1708763123 Sep 21 17:36 e_20_1282186.lm
4 -rw-r--r-- 1     3148711562 Sep 21 17:45 e_30_2564372.lm
5 -rw-r--r-- 1     5880154140 Sep 21 18:09 e_40_5128745.lm
6 -rw-r--r-- 1     10952178505 Sep 21 18:29 e_50_10257490.lm
7 -rw-r--r-- 1     15667577793 Sep 21 20:22 e_60_15386235.lm
8 -rw-r--r-- 1     20098725535 Sep 21 20:37 e_70_20514981.lm
9 -rw-r--r-- 1     48998103628 Sep 21 21:08 e_80_48998103628.lm
```

The considered query files and their sizes are:

```
1 [~ smt10 ~]$ ls -al q_5_gram_1*.txt
2 -rw-r--r-- 1     2697064872 Sep 21 15:47 q_5_gram_100.000.000.txt
3 -rw-r--r-- 1          35 Sep 21 15:57 q_5_gram_1.txt
4 [~ smt10 ~]$
```

The number of m-grams per model is:

e_10_641093.lm

```
1 [~ smt10 ~]$ head -n 15 e_10_641093.lm
2 \data\
3 ngram 1=105682
4 ngram 2=1737132
5 ngram 3=5121040
6 ngram 4=7659442
7 ngram 5=8741158
```

e_20_1282186.lm

```
1 [~ smt10 ~]$ head -n 8 e_20_1282186.lm
2 \data\
3 ngram 1=143867
4 ngram 2=2707890
5 ngram 3=8886067
6 ngram 4=14188078
7 ngram 5=16757214
```

#####e_30_2564372.lm

```
1 [~ smt10 ~]$ head -n 8 e_30_2564372.lm
2 \data\
3 ngram 1=199164
4 ngram 2=4202658
5 ngram 3=15300577
6 ngram 4=26097321
7 ngram 5=31952150
```

e_40_5128745.lm

```
1 [~ smt10 ~]$ head -n 8 e_40_5128745.lm
2 \data\
3 ngram 1=298070
4 ngram 2=6675818
5 ngram 3=26819467
6 ngram 4=48897704
7 ngram 5=62194729
```

e_50_10257490.lm

```
1 [~ smt10 ~]$ head -n 8 e_50_10257490.lm
2 \data\
3 ngram 1=439499
4 ngram 2=10447874
5 ngram 3=46336705
6 ngram 4=90709359
7 ngram 5=120411272
```

e_60_15386235.lm

```
1 [~ smt10 ~]$ head -n 8 e_60_15386235.lm
2 \data\
3 ngram 1=568105
4 ngram 2=13574606
5 ngram 3=63474074
6 ngram 4=129430409
7 ngram 5=176283104
```

e_70_20514981.lm

```
1 [~ smt10 ~]$ head -n 8 e_70_20514981.lm
2 \data\
3 ngram 1=676750
4 ngram 2=16221298
5 ngram 3=78807519
6 ngram 4=165569280
7 ngram 5=229897626
```

e_80_48998103628.lm

```
1 [~ smt10 ~]$ head -n 8 e_80_48998103628.lm
2 \data\
3 ngram 1=2210728
4 ngram 2=67285057
5 ngram 3=183285165
6 ngram 4=396600722
7 ngram 5=563533665
```

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Chapter 2

Todo List

Member [uva::smt::bpbd::server::decoder::de_configurator::allocate_decoder](#) (acr_bool_flag is_stop, const string &source_sent, string &target_sent)

Pre-allocate decoders, make as many as there are threads

Parameters

<i>is_stop</i>	the flag that will be set to true in case one needs to abort the translation process.
<i>source_sent</i>	[in] the source language sentence to translate the source sentence is expected to be tokenized, reduced, and in the lower case.
<i>target_sent</i>	[out] the resulting target language sentence

Returns

an instance of the decoder object.

Member [uva::smt::bpbd::server::decoder::de_configurator::dispose_decoder](#) (sentence_decoder &dec)

Mark the decoder instance as available

Parameters

<i>dec</i>	the decoder to be returned
------------	----------------------------

Class [uva::smt::bpbd::server::lm::dictionary::counting_word_index](#)

{Change or create a new version of the word index that will just use probabilities of the unigrams instead of counting words.}

Namespace [uva::smt::bpbd::server::lm::identifiers](#)

Go through all the LM and change from TShordId and TLongId to phrase_uid, word_uid and basic types!

Member [uva::smt::bpbd::server::lm::proxy::lm_proxy_local::allocate_fast_query_proxy](#) ()

{In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[lm_proxy](#)

Member [uva::smt::bpbd::server::lm::proxy::lm_proxy_local::allocate_slow_query_proxy](#) ()

{In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[lm_proxy](#)

Member [uva::smt::bpbd::server::lm::proxy::lm_proxy_local::dispose_fast_query_proxy](#) (lm_fast_query_proxy &query)

{In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[lm_proxy](#)

Member [uva::smt::bpbd::server::lm::proxy::lm_proxy_local::dispose_slow_query_proxy](#) ([lm_slow_query_proxy](#) &[query](#))

{In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[lm_proxy](#)

Member [uva::smt::bpbd::server::rm::proxy::rm_proxy_local::allocate_query_proxy](#) ()

{In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[rm_proxy](#)

Member [uva::smt::bpbd::server::rm::proxy::rm_proxy_local::dispose_query_proxy](#) ([rm_query_proxy](#) &[query](#))

{In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

Parameters

<i>query</i>	the query to dispose
--------------	----------------------

Member [uva::smt::bpbd::server::rm::proxy::rm_proxy_local::load_model_data](#) (char const *[model_name](#), const [rm_parameters](#) &[params](#))

Add the possibility to choose between the file readers from the command line!

Parameters

<i>the</i>	name of the model being loaded params the model parameters
------------	--

Member [uva::smt::bpbd::server::tm::models::tm_target_entry_temp< max_num_features >::set_features](#) (const size_t [num_features](#), const prob_weight *[features](#))

Get rid of magic constants here!

Parameters

<i>num_features</i>	the number of features to be set, already in the log10 scale
<i>features</i>	the weights to be set into the entry This is an array of translation weights, as we have here↵ : features[0] = p(f e); features[1] = lex(p(f e)); features[2] = p(e f); features[3] = lex(p(e f)); features[4] = phrase penalty; // optional

Member [uva::smt::bpbd::server::tm::proxy::tm_proxy_local::dispose_query_proxy](#) ([tm_query_proxy](#) &[query](#))

In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead

See also

[tm_proxy](#)

Member [uva::smt::bpbd::server::tm::proxy::tm_proxy_local::load_model_data](#) (char const *[model_name](#), const [tm_parameters](#) &[params](#))

Add the possibility to choose between the file readers from the command line!

Parameters

<i>the</i>	name of the model being loaded params the model parameters
------------	--

Member [uva::smt::bpbd::server::trans_job::notify_task_done](#) (const trans_task_ptr &[task](#))

{Do a strict check on the tasks reporting to be finished, these should be the ones from the m_tasks list and they must report themselves only ones. (Optional - for safety).}

Parameters

<i>task</i>	the translation task that is finished
-------------	---------------------------------------

Member `uva::smt::bpbd::server::trans_job_pool::add_job` (`trans_job_ptr trans_job`)

{Later, the tasks pool shall be chosen based on the source and target language. This is for when a server can translate from multiple languages to multiple languages.}

Parameters

<i>trans_job</i>	the job to be added to the administration
------------------	---

Member `uva::smt::bpbd::server::trans_manager::trans_manager` (`const size_t num_threads`)

{Possibly limit the number of allowed open sessions (from one host and the maximum amount of allowed hosts)
This is for later, if the server is put for www access.}

Member `uva::smt::bpbd::server::trans_task_pool::notify_task_cancel` (`trans_task_ptr trans_task`)

{To improve performance we could try checking if the tasks is already running, and if not then search the queue.
Or use other data structure for a more efficient task removal. This is for the future, in case the performance is affected.}

Member `uva::utils::containers::get_mem_incr_strat` (`const mem_inc_types_enum stype, const size_t min_mem_inc, const size_t mem_inc_factor`)

Optimize the switch, it is pretty ugly, use a map or something.

Parameters

<i>stype</i>	the strategy type
<i>min_mem_inc</i>	the minimum memory increment in number of elements
<i>mem_inc_factor</i>	the memory increment factor, the number we will multiply by the computed increment

Returns

the pointer to a newly allocated strategy object

Member `uva::utils::logging::logger::set_reporting_level` (`const string level`)

{This function is ugly improve it by using a map, or a similar so that we could just get an appropriate level for the string.}

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Namespace Index

3.1 Namespace List

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Hierarchical Index

4.1 Class Hierarchy

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Class Index

5.1 Class List

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Chapter 6

File Index

6.1 File List

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Chapter 7

Namespace Documentation

7.1 uva Namespace Reference

Namespaces

- [smt](#)
- [utils](#)

7.2 uva::smt Namespace Reference

Namespaces

- [bpbd](#)

7.3 uva::smt::bpbd Namespace Reference

Namespaces

- [client](#)
- [common](#)
- [server](#)

7.4 uva::smt::bpbd::client Namespace Reference

Classes

- struct [client_config](#)
- struct [trans_job](#)
- class [trans_job_status](#)
- class [trans_manager](#)
- class [translation_client](#)

Typedefs

- typedef [trans_job](#) * [trans_job_ptr](#)

Functions

- ostream & [operator<<](#) (ostream &os, const [trans_job_status](#) &status)

7.4.1 Typedef Documentation

7.4.1.1 typedef trans_job* uva::smt::bpbd::client::trans_job_ptr

Definition at line 43 of file trans_job.hpp.

7.4.2 Function Documentation

7.4.2.1 ostream & uva::smt::bpbd::client::operator<< (ostream & os, const trans_job_status & status)

The stream output operator for the given translation job status instance

Parameters

<i>os</i>	the output stream
<i>status</i>	the status to be output

Returns

the output stream

Definition at line 57 of file trans_job_status.cpp.

7.5 uva::smt::bpbd::common Namespace Reference

Namespaces

- [messaging](#)

Functions

- template<typename INT_TYPE >
INT_TYPE [get_integer](#) (INI<> &ini, string section, string key)
- string [get_string](#) (INI<> &ini, string section, string key)
- float [get_float](#) (INI<> &ini, string section, string key)

7.5.1 Function Documentation

7.5.1.1 float uva::smt::bpbd::common::get_float (INI<> & ini, string section, string key)

Definition at line 128 of file main.hpp.

7.5.1.2 template<typename INT_TYPE > INT_TYPE uva::smt::bpbd::common::get_integer (INI<> & ini, string section, string key)

Definition at line 105 of file main.hpp.

7.5.1.3 string uva::smt::bpbd::common::get_string (INI<> & ini, string section, string key)

Definition at line 120 of file main.hpp.

7.6 uva::smt::bpbd::common::messaging Namespace Reference

Namespaces

- [job_id](#)
- [session_id](#)

Classes

- class [id_manager](#)
- class [trans_job_code](#)
- class [trans_job_request](#)
- class [trans_job_response](#)

Typedefs

- typedef uint64_t [job_id_type](#)
- typedef [trans_job_request](#) * [trans_job_request_ptr](#)
- typedef [trans_job_response](#) * [trans_job_response_ptr](#)
- typedef uint64_t [session_id_type](#)

Functions

- ostream & [operator<<](#) (ostream &os, const [trans_job_code](#) &code)

7.6.1 Typedef Documentation

7.6.1.1 typedef uint64_t uva::smt::bpbd::common::messaging::job_id_type

Definition at line 36 of file trans_job_id.hpp.

7.6.1.2 typedef uint64_t uva::smt::bpbd::common::messaging::session_id_type

Definition at line 35 of file trans_session_id.hpp.

7.6.1.3 typedef trans_job_request* uva::smt::bpbd::common::messaging::trans_job_request_ptr

Definition at line 47 of file trans_job_request.hpp.

7.6.1.4 typedef trans_job_response* uva::smt::bpbd::common::messaging::trans_job_response_ptr

Definition at line 53 of file trans_job_response.hpp.

7.6.2 Function Documentation

7.6.2.1 `ostream & uva::smt::bpbd::common::messaging::operator<< (ostream & os, const trans_job_code & code)`

The stream output operator for the given translation job code instance

Parameters

<code>os</code>	the output stream
<code>code</code>	the code to be output

Returns

the output stream

Definition at line 59 of file `trans_job_code.cpp`.

7.7 `uva::smt::bpbd::common::messaging::job_id` Namespace Reference

7.8 `uva::smt::bpbd::common::messaging::session_id` Namespace Reference

7.9 `uva::smt::bpbd::server` Namespace Reference

Namespaces

- [common](#)
- [decoder](#)
- [lm](#)
- [rm](#)
- [task_id](#)
- [tm](#)

Classes

- struct [server_parameters](#)
- class [trans_job](#)
- class [trans_job_pool](#)
- class [trans_manager](#)
- class [trans_task](#)
- class [trans_task_pool](#)
- class [trans_task_pool_worker](#)
- class [translation_server](#)

Typedefs

- typedef `uint16_t` [phrase_length](#)
- typedef `float` [prob_weight](#)
- typedef `uint64_t` [phrase_uid](#)
- typedef `uint64_t` [word_uid](#)
- typedef `trans_job *` [trans_job_ptr](#)
- typedef `trans_task *` [trans_task_ptr](#)
- typedef `uint64_t` [task_id_type](#)

Functions

- void [stop](#) ([translation_server](#) &server, thread &server_thread)
- void [print_the_prompt](#) ()
- void [print_server_commands](#) ()
- bool [begins_with](#) (const string &str, const string &prefix)
- string [get_string_value](#) (const string &str, const string &prefix)
- int32_t [get_int_value](#) (const string &str, const string &prefix)
- float [get_float_value](#) (const string &str, const string &prefix)
- void [set_log_level](#) (const string &cmd, const string &prefix)
- void [set_num_threads](#) ([server_parameters](#) ¶ms, [translation_server](#) &server, const string &cmd, const string &prefix)
- void [set_decoder_params](#) (const string &cmd, [de_parameters](#) &de_params)
- bool [process_input_cmd](#) ([server_parameters](#) ¶ms, [translation_server](#) &server, thread &server_thread, char command[CMD_BUFF_SIZE])
- void [perform_command_loop](#) ([server_parameters](#) ¶ms, [translation_server](#) &server, thread &server_thread)

7.9.1 Typedef Documentation

7.9.1.1 typedef uint16_t uva::smt::bpbd::server::phrase_length

Definition at line 39 of file server_consts.hpp.

7.9.1.2 typedef uint64_t uva::smt::bpbd::server::phrase_uid

Definition at line 45 of file server_consts.hpp.

7.9.1.3 typedef float uva::smt::bpbd::server::prob_weight

Definition at line 42 of file server_consts.hpp.

7.9.1.4 typedef uint64_t uva::smt::bpbd::server::task_id_type

Definition at line 39 of file trans_task_id.hpp.

7.9.1.5 typedef trans_job* uva::smt::bpbd::server::trans_job_ptr

Definition at line 51 of file trans_job.hpp.

7.9.1.6 typedef trans_task * uva::smt::bpbd::server::trans_task_ptr

Definition at line 55 of file trans_task.hpp.

7.9.1.7 typedef uint64_t uva::smt::bpbd::server::word_uid

Definition at line 48 of file server_consts.hpp.

7.9.2 Function Documentation

7.9.2.1 `bool uva::smt::bpbd::server::begins_with (const string & str, const string & prefix)` `[inline]`

Allows to test if a string begins with a substring

Parameters

<i>str</i>	the string to check
<i>the</i>	prefix

Returns

true if the string begins with the prefix

Definition at line 100 of file cmd_line_handler.hpp.

7.9.2.2 float uva::smt::bpbd::server::get_float_value (const string & *str*, const string & *prefix*) [inline]

Allows to parse the command parameter and return it

Parameters

<i>str</i>	the command string
<i>prefix</i>	the command pregix

Returns

the parsed value

Definition at line 139 of file cmd_line_handler.hpp.

7.9.2.3 int32_t uva::smt::bpbd::server::get_int_value (const string & *str*, const string & *prefix*) [inline]

Allows to parse the command parameter and return it

Parameters

<i>str</i>	the command string
<i>prefix</i>	the command pregix

Returns

the parsed value

Definition at line 120 of file cmd_line_handler.hpp.

7.9.2.4 string uva::smt::bpbd::server::get_string_value (const string & *str*, const string & *prefix*) [inline]

Allows to parse the command parameter and return it as a string

Parameters

<i>str</i>	the command string
<i>prefix</i>	the command pregix

Returns

the parsed value

Definition at line 110 of file cmd_line_handler.hpp.

7.9.2.5 void uva::smt::bpbd::server::perform_command_loop (server_parameters & *params*, translation_server & *server*, thread & *server_thread*)

Runs the server's command loop

Parameters

<i>params</i>	some server params
<i>server</i>	the server being run
<i>server_thread</i>	the server thread

Definition at line 311 of file cmd_line_handler.hpp.

7.9.2.6 void uva::smt::bpbd::server::print_server_commands ()

Prints the available server commands

Definition at line 74 of file cmd_line_handler.hpp.

7.9.2.7 void uva::smt::bpbd::server::print_the_prompt ()

Allows to print the prompt

Definition at line 67 of file cmd_line_handler.hpp.

7.9.2.8 bool uva::smt::bpbd::server::process_input_cmd (server_parameters & params, translation_server & server, thread & server_thread, char command[CMD_BUFF_SIZE]) [inline]

Allowsto process the command params some server parameters

Parameters

<i>server</i>	the server being run
<i>server_thread</i>	the server thread
<i>command</i>	the command sting to handle

Returns

true if we need to stop, otherwise false

Definition at line 251 of file cmd_line_handler.hpp.

7.9.2.9 void uva::smt::bpbd::server::set_decoder_params (const string & cmd, de_parameters & de_params) [inline]

Allows to set some decoder parameters

Parameters

<i>cmd</i>	the command to process, if not a command for setting decoder parameters an error will be reported.
<i>m_de_params</i>	the reference to the decoder parameters to set with new values.

Definition at line 196 of file cmd_line_handler.hpp.

7.9.2.10 void uva::smt::bpbd::server::set_log_level (const string & cmd, const string & prefix) [inline]

Allows to set the debug level

Parameters

<i>cmd</i>	the debug level
------------	-----------------

Definition at line 156 of file cmd_line_handler.hpp.

7.9.2.11 void uva::smt::bpbd::server::set_num_threads (server_parameters & *params*, translation_server & *server*, const string & *cmd*, const string & *prefix*) [inline]

Allows to set the number of worker threads

Parameters

<i>params</i>	the server parameters
<i>server</i>	the translation server
<i>cmd</i>	the input command
<i>prefix</i>	the command prefix

Definition at line 167 of file cmd_line_handler.hpp.

7.9.2.12 void uva::smt::bpbd::server::stop (translation_server & *server*, thread & *server_thread*)

Allows to stop the server;

Parameters

<i>server</i>	the server being run
<i>server_thread</i>	the server thread

Definition at line 53 of file cmd_line_handler.hpp.

7.10 uva::smt::bpbd::server::common Namespace Reference

Namespaces

- [models](#)

7.11 uva::smt::bpbd::server::common::models Namespace Reference

7.12 uva::smt::bpbd::server::decoder Namespace Reference

Namespaces

- [sentence](#)
- [stack](#)

Classes

- class [de_configurator](#)
- struct [de_parameters_struct](#)

Typedefs

- typedef [de_parameters_struct](#) [de_parameters](#)

7.12.1 Typedef Documentation

7.12.1.1 typedef de_parameters_struct uva::smt::bpbd::server::decoder::de_parameters

Definition at line 174 of file de_parameters.hpp.

7.13 uva::smt::bpbd::server::decoder::sentence Namespace Reference

Classes

- struct [phrase_data_entry](#)
- class [sentence_decoder](#)

Typedefs

- typedef [upp_diag_matrix](#)< [phrase_data_entry](#) > [sentence_data_map](#)

7.13.1 Typedef Documentation

7.13.1.1 typedef upp_diag_matrix<phrase_data_entry> uva::smt::bpbd::server::decoder::sentence↔ ::sentence_data_map

Definition at line 99 of file sentence_data_map.hpp.

7.14 uva::smt::bpbd::server::decoder::stack Namespace Reference

Classes

- class [multi_stack](#)
- struct [stack_data](#)
- class [stack_level](#)
- class [stack_state_tmpl](#)
- struct [state_data_tmpl](#)

Typedefs

- typedef [stack_state_tmpl](#)< MAX_WORDS_PER_SENTENCE, LM_HISTORY_LEN_MAX, LM_MAX_QU↔
ERY_LEN > [stack_state](#)
- typedef [stack_state](#) * [stack_state_ptr](#)
- typedef function< void([stack_state_ptr](#)) > [add_new_state_function](#)
- typedef [stack_level](#) * [stack_level_ptr](#)

7.14.1 Typedef Documentation

7.14.1.1 typedef function<void(stack_state_ptr) > uva::smt::bpbd::server::decoder::stack::add_new_state_↔ function

Definition at line 47 of file stack_data.hpp.

7.14.1.2 `typedef stack_level* uva::smt::bpbd::server::decoder::stack::stack_level_ptr`

Definition at line 38 of file `stack_level.hpp`.

7.14.1.3 `typedef stack_state_tmpl<MAX_WORDS_PER_SENTENCE, LM_HISTORY_LEN_MAX, LM_MAX_QUERY_LEN>
uva::smt::bpbd::server::decoder::stack::stack_state`

Definition at line 37 of file `stack_data.hpp`.

7.14.1.4 `typedef stack_state* uva::smt::bpbd::server::decoder::stack::stack_state_ptr`

Definition at line 44 of file `stack_data.hpp`.

7.15 `uva::smt::bpbd::server::lm` Namespace Reference

Namespaces

- [__C2DHybridTrie](#)
- [__C2DMapTrie](#)
- [__C2WArrayTrie](#)
- [__executor](#)
- [__G2DMapTrie](#)
- [__H2DMapTrie](#)
- [__LayeredTrieBase](#)
- [__W2CArrayTrie](#)
- [__W2CHybridTrie](#)
- [arpa](#)
- [caching](#)
- [dictionary](#)
- [identifiers](#)
- [m_grams](#)
- [proxy](#)

Classes

- class [c2d_hybrid_trie](#)
- class [c2d_map_trie](#)
- class [c2w_array_trie](#)
- class [g2d_map_trie](#)
- class [generic_trie_base](#)
- class [h2d_map_trie](#)
- class [layered_trie_base](#)
- class [lm_configurator](#)
- struct [lm_parameters](#)
- class [m_gram_query](#)
- class [w2c_array_trie](#)
- class [w2c_hybrid_trie](#)
- class [W2CH_UM_Storage](#)
- class [W2CH_UM_StorageFactory](#)
- class [word_index_trie_base](#)

Typedefs

- typedef [hashing_word_index](#) [lm_word_index](#)
- typedef [h2d_map_trie](#)< [lm_word_index](#) > [lm_model_type](#)
- typedef [cstyle_file_reader](#) [lm_model_reader](#)
- typedef [lm_basic_builder](#)< [lm_model_type](#), [lm_model_reader](#) > [lm_builder_type](#)
- typedef [c2d_hybrid_trie](#)< [basic_word_index](#) > [TC2DHybridTrieBasic](#)
- typedef [c2d_hybrid_trie](#)< [counting_word_index](#) > [TC2DHybridTrieCount](#)
- typedef [c2d_hybrid_trie](#)< [basic_optimizing_word_index](#) > [TC2DHybridTrieOptBasic](#)
- typedef [c2d_hybrid_trie](#)< [counting_optimizing_word_index](#) > [TC2DHybridTrieOptCount](#)
- typedef [c2d_hybrid_trie](#)< [hashing_word_index](#) > [TC2DHybridTrieHashing](#)
- typedef [c2d_map_trie](#)< [basic_word_index](#) > [TC2DMapTrieBasic](#)
- typedef [c2d_map_trie](#)< [counting_word_index](#) > [TC2DMapTrieCount](#)
- typedef [c2d_map_trie](#)< [hashing_word_index](#) > [TC2DMapTrieHashing](#)
- typedef [c2d_map_trie](#)< [basic_optimizing_word_index](#) > [TC2DMapTrieOptBasic](#)
- typedef [c2d_map_trie](#)< [counting_optimizing_word_index](#) > [TC2DMapTrieOptCount](#)
- typedef [c2w_array_trie](#)< [basic_word_index](#) > [TC2WArrayTrieBasic](#)
- typedef [c2w_array_trie](#)< [counting_word_index](#) > [TC2WArrayTrieCount](#)
- typedef [c2w_array_trie](#)< [basic_optimizing_word_index](#) > [TC2WArrayTrieOptBasic](#)
- typedef [c2w_array_trie](#)< [counting_optimizing_word_index](#) > [TC2WArrayTrieOptCount](#)
- typedef [c2w_array_trie](#)< [hashing_word_index](#) > [TC2WArrayTrieHashing](#)
- typedef [g2d_map_trie](#)< [basic_word_index](#) > [TG2DMapTrieBasic](#)
- typedef [g2d_map_trie](#)< [counting_word_index](#) > [TG2DMapTrieCount](#)
- typedef [g2d_map_trie](#)< [basic_optimizing_word_index](#) > [TG2DMapTrieOptBasic](#)
- typedef [g2d_map_trie](#)< [counting_optimizing_word_index](#) > [TG2DMapTrieOptCount](#)
- typedef [g2d_map_trie](#)< [hashing_word_index](#) > [TG2DMapTrieHashing](#)
- typedef [h2d_map_trie](#)< [basic_word_index](#) > [TH2DMapTrieBasic](#)
- typedef [h2d_map_trie](#)< [counting_word_index](#) > [TH2DMapTrieCount](#)
- typedef [h2d_map_trie](#)< [basic_optimizing_word_index](#) > [TH2DMapTrieOptBasic](#)
- typedef [h2d_map_trie](#)< [counting_optimizing_word_index](#) > [TH2DMapTrieOptCount](#)
- typedef [h2d_map_trie](#)< [hashing_word_index](#) > [TH2DMapTrieHashing](#)
- typedef [w2c_array_trie](#)< [basic_word_index](#) > [TW2CArrayTrieBasic](#)
- typedef [w2c_array_trie](#)< [counting_word_index](#) > [TW2CArrayTrieCount](#)
- typedef [w2c_array_trie](#)< [basic_optimizing_word_index](#) > [TW2CArrayTrieOptBasic](#)
- typedef [w2c_array_trie](#)< [counting_optimizing_word_index](#) > [TW2CArrayTrieOptCount](#)
- typedef [w2c_array_trie](#)< [hashing_word_index](#) > [TW2CArrayTrieHashing](#)
- typedef [w2c_hybrid_trie](#)< [basic_word_index](#) > [TW2CHybridTrieBasic](#)
- typedef [w2c_hybrid_trie](#)< [counting_word_index](#) > [TW2CHybridTrieCount](#)
- typedef [w2c_hybrid_trie](#)< [basic_optimizing_word_index](#) > [TW2CHybridTrieOptBasic](#)
- typedef [w2c_hybrid_trie](#)< [counting_optimizing_word_index](#) > [TW2CHybridTrieOptCount](#)
- typedef [w2c_hybrid_trie](#)< [hashing_word_index](#) > [TW2CHybridTrieHashing](#)
- typedef [pair](#)< [const TShortId](#), [TShortId](#) > [TStorageMapEntry](#)
- typedef [greedy_memory_allocator](#)< [TStorageMapEntry](#) > [TStorageMapAllocator](#)
- typedef [unordered_map](#)< [TShortId](#), [TShortId](#), [std::hash](#)< [TShortId](#) >, [std::equal_to](#)< [TShortId](#) >, [TStorageMapAllocator](#) > [TStorageUnsignedMap](#)
- typedef [map](#)< [TShortId](#), [TShortId](#) > [TStorageMap](#)

Enumerations

- enum [MGramStatusEnum](#) { [UNDEFINED_MGS](#) = 0, [BAD_END_WORD_UNKNOWN_MGS](#) = 1, [BAD_NO_PAYLOAD_MGS](#) = 2, [GOOD_PRESENT_MGS](#) = 3 }

Functions

- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_hybrid_trie, basic_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_hybrid_trie, counting_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_hybrid_trie, hashing_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_hybrid_trie, basic_optimizing_word_index↔_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_hybrid_trie, counting_optimizing_word_index↔_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_map_trie, basic_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_map_trie, counting_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_map_trie, hashing_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_map_trie, basic_optimizing_word_index↔_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2d_map_trie, counting_optimizing_word_index↔_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2w_array_trie, basic_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2w_array_trie, counting_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2w_array_trie, hashing_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2w_array_trie, basic_optimizing_word_index↔_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (c2w_array_trie, counting_optimizing_word_index↔_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (g2d_map_trie, basic_word_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (g2d_map_trie, counting_word_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (g2d_map_trie, hashing_word_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (g2d_map_trie, basic_optimizing_word_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (g2d_map_trie, counting_optimizing_word_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (h2d_map_trie, basic_word_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (h2d_map_trie, counting_word_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (h2d_map_trie, hashing_word_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (h2d_map_trie, basic_optimizing_word_index)
- [INSTANTIATE_TRIE_TEMPLATE_TYPE](#) (h2d_map_trie, counting_optimizing_word_index)
- [ostream & operator<<](#) (ostream &stream, const m_gram_query &query)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_array_trie, basic_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_array_trie, counting_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_array_trie, hashing_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_array_trie, basic_optimizing_word_index↔_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_array_trie, counting_optimizing_word_index↔_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_hybrid_trie, basic_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_hybrid_trie, counting_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_hybrid_trie, hashing_word_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_hybrid_trie, basic_optimizing_word_index↔_index)
- [INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE](#) (w2c_hybrid_trie, counting_optimizing_word_index↔_word_index)

Variables

- `class uva::smt::bpbdd::server::lm::lm_configurator __attribute__((no_sanitize_memory))`
- `const prob_weight DEF_UNK_WORD_LOG_PROB_WEIGHT = -10.0f`

7.15.1 Typedef Documentation

7.15.1.1 `typedef lm_basic_builder<lm_model_type, lm_model_reader> uva::smt::bpbd::server::lm::lm_builder_type`

Definition at line 78 of file lm_configs.hpp.

7.15.1.2 `typedef cstyle_file_reader uva::smt::bpbd::server::lm::lm_model_reader`

Definition at line 75 of file lm_configs.hpp.

7.15.1.3 `typedef h2d_map_trie<lm_word_index> uva::smt::bpbd::server::lm::lm_model_type`

Definition at line 72 of file lm_configs.hpp.

7.15.1.4 `typedef hashing_word_index uva::smt::bpbd::server::lm::lm_word_index`

Definition at line 69 of file lm_configs.hpp.

7.15.1.5 `typedef c2d_hybrid_trie< basic_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieBasic`

Definition at line 346 of file c2d_hybrid_trie.hpp.

7.15.1.6 `typedef c2d_hybrid_trie< counting_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieCount`

Definition at line 347 of file c2d_hybrid_trie.hpp.

7.15.1.7 `typedef c2d_hybrid_trie< hashing_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieHashing`

Definition at line 350 of file c2d_hybrid_trie.hpp.

7.15.1.8 `typedef c2d_hybrid_trie< basic_optimizing_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieOptBasic`

Definition at line 348 of file c2d_hybrid_trie.hpp.

7.15.1.9 `typedef c2d_hybrid_trie< counting_optimizing_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieOptCount`

Definition at line 349 of file c2d_hybrid_trie.hpp.

7.15.1.10 `typedef c2d_map_trie<basic_word_index > uva::smt::bpbd::server::lm::TC2DMapTrieBasic`

Definition at line 355 of file c2d_map_trie.hpp.

7.15.1.11 `typedef c2d_map_trie<counting_word_index > uva::smt::bpbd::server::lm::TC2DMapTrieCount`

Definition at line 356 of file c2d_map_trie.hpp.

7.15.1.12 `typedef c2d_map_trie<hashing_word_index> uva::smt::bpbd::server::lm::TC2DMapTrieHashing`

Definition at line 357 of file `c2d_map_trie.hpp`.

7.15.1.13 `typedef c2d_map_trie<basic_optimizing_word_index> uva::smt::bpbd::server::lm::TC2DMapTrieOptBasic`

Definition at line 358 of file `c2d_map_trie.hpp`.

7.15.1.14 `typedef c2d_map_trie<counting_optimizing_word_index> uva::smt::bpbd::server::lm::TC2DMapTrieOptCount`

Definition at line 359 of file `c2d_map_trie.hpp`.

7.15.1.15 `typedef c2w_array_trie<basic_word_index> uva::smt::bpbd::server::lm::TC2WArrayTrieBasic`

Definition at line 484 of file `c2w_array_trie.hpp`.

7.15.1.16 `typedef c2w_array_trie<counting_word_index> uva::smt::bpbd::server::lm::TC2WArrayTrieCount`

Definition at line 485 of file `c2w_array_trie.hpp`.

7.15.1.17 `typedef c2w_array_trie<hashing_word_index> uva::smt::bpbd::server::lm::TC2WArrayTrieHashing`

Definition at line 488 of file `c2w_array_trie.hpp`.

7.15.1.18 `typedef c2w_array_trie<basic_optimizing_word_index> uva::smt::bpbd::server::lm::TC2WArrayTrieOptBasic`

Definition at line 486 of file `c2w_array_trie.hpp`.

7.15.1.19 `typedef c2w_array_trie<counting_optimizing_word_index> uva::smt::bpbd::server::lm::TC2WArrayTrieOptCount`

Definition at line 487 of file `c2w_array_trie.hpp`.

7.15.1.20 `typedef g2d_map_trie<basic_word_index> uva::smt::bpbd::server::lm::TG2DMapTrieBasic`

Definition at line 300 of file `g2d_map_trie.hpp`.

7.15.1.21 `typedef g2d_map_trie<counting_word_index> uva::smt::bpbd::server::lm::TG2DMapTrieCount`

Definition at line 301 of file `g2d_map_trie.hpp`.

7.15.1.22 `typedef g2d_map_trie<hashing_word_index> uva::smt::bpbd::server::lm::TG2DMapTrieHashing`

Definition at line 304 of file `g2d_map_trie.hpp`.

7.15.1.23 `typedef g2d_map_trie<basic_optimizing_word_index> uva::smt::bpbd::server::lm::TG2DMap↵
TrieOptBasic`

Definition at line 302 of file g2d_map_trie.hpp.

7.15.1.24 `typedef g2d_map_trie<counting_optimizing_word_index> uva::smt::bpbd::server::lm::TG2D↵
MapTrieOptCount`

Definition at line 303 of file g2d_map_trie.hpp.

7.15.1.25 `typedef h2d_map_trie<basic_word_index> uva::smt::bpbd::server::lm::TH2DMapTrieBasic`

Definition at line 300 of file h2d_map_trie.hpp.

7.15.1.26 `typedef h2d_map_trie<counting_word_index> uva::smt::bpbd::server::lm::TH2DMapTrieCount`

Definition at line 301 of file h2d_map_trie.hpp.

7.15.1.27 `typedef h2d_map_trie<hashing_word_index> uva::smt::bpbd::server::lm::TH2DMapTrieHashing`

Definition at line 304 of file h2d_map_trie.hpp.

7.15.1.28 `typedef h2d_map_trie<basic_optimizing_word_index> uva::smt::bpbd::server::lm::TH2DMap↵
TrieOptBasic`

Definition at line 302 of file h2d_map_trie.hpp.

7.15.1.29 `typedef h2d_map_trie<counting_optimizing_word_index> uva::smt::bpbd::server::lm::TH2D↵
MapTrieOptCount`

Definition at line 303 of file h2d_map_trie.hpp.

7.15.1.30 `typedef map<TShortId, TShortId> uva::smt::bpbd::server::lm::TStorageMap`

Definition at line 56 of file w2ch_um_storage.hpp.

7.15.1.31 `typedef greedy_memory_allocator< TStorageMapEntry> uva::smt::bpbd::server::lm::TStorage↵
MapAllocator`

Definition at line 52 of file w2ch_um_storage.hpp.

7.15.1.32 `typedef pair< const TShortId, TShortId> uva::smt::bpbd::server::lm::TStorageMapEntry`

Definition at line 50 of file w2ch_um_storage.hpp.

7.15.1.33 `typedef unordered_map<TShortId, TShortId, std::hash<TShortId>, std::equal_to<TShortId>,
TStorageMapAllocator> uva::smt::bpbd::server::lm::TStorageUnsignedMap`

Definition at line 54 of file w2ch_um_storage.hpp.

7.15.1.34 `typedef w2c_array_trie<basic_word_index > uva::smt::bpbd::server::lm::TW2CArraryTrieBasic`

Definition at line 570 of file w2c_array_trie.hpp.

7.15.1.35 `typedef w2c_array_trie<counting_word_index > uva::smt::bpbd::server::lm::TW2CArraryTrieCount`

Definition at line 571 of file w2c_array_trie.hpp.

7.15.1.36 `typedef w2c_array_trie<hashing_word_index > uva::smt::bpbd::server::lm::TW2CArraryTrie↵
Hashing`

Definition at line 574 of file w2c_array_trie.hpp.

7.15.1.37 `typedef w2c_array_trie<basic_optimizing_word_index > uva::smt::bpbd::server::lm::TW2C↵
ArraryTrieOptBasic`

Definition at line 572 of file w2c_array_trie.hpp.

7.15.1.38 `typedef w2c_array_trie<counting_optimizing_word_index > uva::smt::bpbd::server::lm::TW2C↵
ArraryTrieOptCount`

Definition at line 573 of file w2c_array_trie.hpp.

7.15.1.39 `typedef w2c_hybrid_trie<basic_word_index> uva::smt::bpbd::server::lm::TW2CHybridTrieBasic`

Definition at line 323 of file w2c_hybrid_trie.hpp.

7.15.1.40 `typedef w2c_hybrid_trie<counting_word_index> uva::smt::bpbd::server::lm::TW2CHybridTrie↵
Count`

Definition at line 324 of file w2c_hybrid_trie.hpp.

7.15.1.41 `typedef w2c_hybrid_trie<hashing_word_index> uva::smt::bpbd::server::lm::TW2CHybridTrie↵
Hashing`

Definition at line 327 of file w2c_hybrid_trie.hpp.

7.15.1.42 `typedef w2c_hybrid_trie<basic_optimizing_word_index> uva::smt::bpbd::server::lm::TW2C↵
HybridTrieOptBasic`

Definition at line 325 of file w2c_hybrid_trie.hpp.

7.15.1.43 `typedef w2c_hybrid_trie<counting_optimizing_word_index> uva::smt::bpbd::server::lm::TW2C↵
HybridTrieOptCount`

Definition at line 326 of file w2c_hybrid_trie.hpp.

7.15.2 Enumeration Type Documentation

7.15.2.1 enum uva::smt::bpbd::server::lm::MGramStatusEnum

Contains the m-gram status values: 0. UNDEFINED_MGS - the status is undefined

1. BAD_END_WORD_UNKNOWN_MGS - the m-gram is definitely not present the end word is unknown
2. BAD_NO_PAYLOAD_MGS - the m-gram is definitely not present, the m-gram hash is not cached, or it is not found in the trie (the meaning depends on the context)
3. GOOD_PRESENT_MGS - the m-gram is potentially present, its hash is cached, or it is found in the trie (the meaning depends on the context)

Enumerator

UNDEFINED_MGS
BAD_END_WORD_UNKNOWN_MGS
BAD_NO_PAYLOAD_MGS
GOOD_PRESENT_MGS

Definition at line 81 of file generic_trie_base.hpp.

7.15.3 Function Documentation

- 7.15.3.1 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (w2c_array_trie , basic_word_index)
- 7.15.3.2 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (w2c_array_trie , counting_word_index)
- 7.15.3.3 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (w2c_array_trie , hashing_word_index)
- 7.15.3.4 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (w2c_array_trie , basic_optimizing_word_index)
- 7.15.3.5 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (w2c_array_trie , counting_optimizing_word_index)
- 7.15.3.6 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (c2w_array_trie , basic_word_index)
- 7.15.3.7 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (c2w_array_trie , counting_word_index)
- 7.15.3.8 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (c2w_array_trie , hashing_word_index)
- 7.15.3.9 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (c2w_array_trie , basic_optimizing_word_index)
- 7.15.3.10 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (c2w_array_trie , counting_optimizing_word_index)
- 7.15.3.11 uva::smt::bpbd::server::lm::INSTANTIATE_LAYERED_TRIE_TEMPLATES_NAME_TYPE (w2c_hybrid_trie , basic_word_index)

- 7.15.3.12 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (w2c_hybrid_trie , counting_word_index)`
- 7.15.3.13 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (w2c_hybrid_trie , hashing_word_index)`
- 7.15.3.14 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (w2c_hybrid_trie , basic_optimizing_word_index)`
- 7.15.3.15 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (w2c_hybrid_trie , counting_optimizing_word_index)`
- 7.15.3.16 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_map_trie , basic_word_index)`
- 7.15.3.17 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_map_trie , counting_word_index)`
- 7.15.3.18 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_map_trie , hashing_word_index)`
- 7.15.3.19 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_map_trie , basic_optimizing_word_index)`
- 7.15.3.20 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_map_trie , counting_optimizing_word_index)`
- 7.15.3.21 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_hybrid_trie , basic_word_index)`
- 7.15.3.22 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_hybrid_trie , counting_word_index)`
- 7.15.3.23 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_hybrid_trie , hashing_word_index)`
- 7.15.3.24 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_hybrid_trie , basic_optimizing_word_index)`
- 7.15.3.25 `uva::smt::bpbd::server::lm::INstantiate_Layered_Trie_Templates_Name_Type (c2d_hybrid_trie , counting_optimizing_word_index)`
- 7.15.3.26 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (h2d_map_trie , basic_word_index)`
- 7.15.3.27 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (h2d_map_trie , counting_word_index)`
- 7.15.3.28 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (h2d_map_trie , hashing_word_index)`
- 7.15.3.29 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (h2d_map_trie , basic_optimizing_word_index)`
- 7.15.3.30 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (h2d_map_trie , counting_optimizing_word_index)`
- 7.15.3.31 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (g2d_map_trie , basic_word_index)`

7.15.3.32 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (g2d_map_trie , counting_word_index)`

7.15.3.33 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (g2d_map_trie , hashing_word_index)`

7.15.3.34 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (g2d_map_trie , basic_optimizing_word_index)`

7.15.3.35 `uva::smt::bpbd::server::lm::INstantiate_Trie_Template_Type (g2d_map_trie , counting_optimizing_word_index)`

7.15.3.36 `ostream& uva::smt::bpbd::server::lm::operator<< (ostream & stream, const m_gram_query & query)`

Allows to serialize the m-gram query to the output stream as a string

Parameters

<i>stream</i>	the reference to the stream to output into
<i>query</i>	the query object to output

Returns

the reference to the stream

Definition at line 40 of file `m_gram_query.cpp`.

7.15.4 Variable Documentation

7.15.4.1 `class uva::smt::bpbd::server::lm::lm_configurator uva::smt::bpbd::server::lm::__attribute__`

7.15.4.2 `const prob_weight uva::smt::bpbd::server::lm::DEF_UNK_WORD_LOG_PROB_WEIGHT = -10.0f`

Definition at line 68 of file `server_configs.hpp`.

7.16 uva::smt::bpbd::server::lm::__C2DHybridTrie Namespace Reference

7.17 uva::smt::bpbd::server::lm::__C2DMapTrie Namespace Reference

7.18 uva::smt::bpbd::server::lm::__C2WArrayTrie Namespace Reference

Classes

- struct [TCtxIdProbData](#)
- struct [TWordIdPBDData](#)

Functions

- bool [operator<](#) (const [TWordIdPBDData](#) &one, const [TWordIdPBDData](#) &two)
- int8_t [compare](#) (const [TCtxIdProbData](#) &one, const [TCtxIdProbData](#) &two)
- bool [operator<](#) (const [TCtxIdProbData](#) &one, const [TCtxIdProbData](#) &two)
- bool [operator>](#) (const [TCtxIdProbData](#) &one, const [TCtxIdProbData](#) &two)
- bool [operator==](#) (const [TCtxIdProbData](#) &one, const [TCtxIdProbData](#) &two)

7.18.1 Function Documentation

7.18.1.1 `int8_t uva::smt::bpbd::server::lm::__C2WArrayTrie::compare (const TCtxIdProbData & one, const TCtxIdProbData & two) [inline]`

This is the compare operator implementation

Parameters

<i>one</i>	the first object to compare
<i>two</i>	the second object to compare

Returns

-1 if (word_id,ctx_id) < (word_id,ctx_id) 0 if (word_id,ctx_id) == (word_id,ctx_id) +1 if (word_id,ctx_id) > (word_id,ctx_id)

Definition at line 95 of file c2w_array_trie.hpp.

7.18.1.2 `bool uva::smt::bpbd::server::lm::__C2WArrayTrie::operator< (const TWordIdPBData & one, const TWordIdPBData & two) [inline]`

This is the less operator implementation

Parameters

<i>one</i>	the first object to compare
<i>two</i>	the second object to compare

Returns

true one.id < two.id

Definition at line 69 of file c2w_array_trie.hpp.

7.18.1.3 `bool uva::smt::bpbd::server::lm::__C2WArrayTrie::operator< (const TCtxIdProbData & one, const TCtxIdProbData & two) [inline]`

Definition at line 120 of file c2w_array_trie.hpp.

7.18.1.4 `bool uva::smt::bpbd::server::lm::__C2WArrayTrie::operator== (const TCtxIdProbData & one, const TCtxIdProbData & two) [inline]`

Definition at line 128 of file c2w_array_trie.hpp.

7.18.1.5 `bool uva::smt::bpbd::server::lm::__C2WArrayTrie::operator> (const TCtxIdProbData & one, const TCtxIdProbData & two) [inline]`

Definition at line 124 of file c2w_array_trie.hpp.

7.19 uva::smt::bpbd::server::lm::__executor Namespace Reference

Classes

- struct [lm_exec_params](#)

7.20 uva::smt::bpbd::server::lm::__G2DMapTrie Namespace Reference

Classes

- struct [S_M_GramData](#)

7.21 `uva::smt::bpbd::server::lm::__H2DMapTrie` Namespace Reference

Classes

- struct [S_M_GramData](#)

7.22 `uva::smt::bpbd::server::lm::__LayeredTrieBase` Namespace Reference

Functions

- `template<typename TrieType , phrase_length CURR_LEVEL, bool GET_BACK_OFF_CTX_ID, debug_levels_enum LOG_LEVEL = debug_levels_enum::DEBUG1>`
`phrase_length search_m_gram_ctx_id (const TrieType &trie, const word_uid *const word_ids, TLongId &prev_ctx_id, TLongId &ctx_id)`
- `template<typename TrieType , phrase_length CURR_LEVEL, debug_levels_enum LOG_LEVEL>`
`void get_context_id (TrieType &trie, const model_m_gram &gram, TLongId &ctx_id)`

7.22.1 Function Documentation

7.22.1.1 `template<typename TrieType , phrase_length CURR_LEVEL, debug_levels_enum LOG_LEVEL> void`
`uva::smt::bpbd::server::lm::__LayeredTrieBase::get_context_id (TrieType & trie, const model_m_gram & gram,`
`TLongId & ctx_id) [inline]`

This function computes the context id of the N-gram given by the tokens, e.g. [w1 w2 w3 w4]

WARNING: Must be called on M-grams with M > 1!

Parameters

<i>gram</i>	the m-gram we need to compute the context for.
<i>mgram_word_ids</i>	the m-gram word ids aligned to the end of the array
<i>the</i>	resulting hash of the context(w1 w2 w3)

Returns

true if the context was found otherwise false

Definition at line 113 of file `layered_trie_base.hpp`.

7.22.1.2 `template<typename TrieType , phrase_length CURR_LEVEL, bool GET_BACK_OFF_CTX_ID, debug_levels_enum`
`LOG_LEVEL = debug_levels_enum::DEBUG1> phrase_length uva::smt::bpbd::server::lm::__LayeredTrieBase::`
`search_m_gram_ctx_id (const TrieType & trie, const word_uid *const word_ids, TLongId & prev_ctx_id,`
`TLongId & ctx_id) [inline]`

Allows to obtain the context and previous context id for the sub-m-gram defined by the given template parameters.

Parameters

<i>CURR_LEVEL</i>	the level of the sub-m-gram for which the context id is to be computed
<i>DO_PREV_CONTEXT</i>	true if the previous context id is to be computed, otherwise false

<i>LOG_LEVEL</i>	the desired debug level
<i>word_ids</i>	the array of word ids to consider for computing the context id
<i>prev_ctx_id</i>	the computed previous context id, if computed
<i>ctx_id</i>	the context id, if computed

Returns

the level of the m-gram for which the last context id could be computed

Definition at line 71 of file layered_trie_base.hpp.

7.23 uva::smt::bpbd::server::lm::__W2CArryTrie Namespace Reference**Classes**

- struct [S_M_GramData](#)

Typedefs

- typedef [S_M_GramData](#)< [m_gram_payload](#) > [T_M_GramData](#)
- typedef [S_M_GramData](#)< [prob_weight](#) > [T_N_GramData](#)

Functions

- bool [operator](#)< (const [T_M_GramData](#) &one, const [T_M_GramData](#) &two)
- bool [operator](#)< (const [T_N_GramData](#) &one, const [T_N_GramData](#) &two)

7.23.1 Typedef Documentation

7.23.1.1 typedef [S_M_GramData](#)<[m_gram_payload](#)> [uva::smt::bpbd::server::lm::__W2CArryTrie::T_M_GramData](#)

Definition at line 77 of file w2c_array_trie.hpp.

7.23.1.2 typedef [S_M_GramData](#)<[prob_weight](#)> [uva::smt::bpbd::server::lm::__W2CArryTrie::T_N_GramData](#)

Definition at line 78 of file w2c_array_trie.hpp.

7.23.2 Function Documentation

7.23.2.1 bool [uva::smt::bpbd::server::lm::__W2CArryTrie::operator](#)< (const [T_M_GramData](#) & *one*, const [T_M_GramData](#) & *two*) [\[inline\]](#)

This is the less operator implementation

Parameters

<i>one</i>	the first object to compare
<i>two</i>	the second object to compare

Returns

true if ctx_id of one is smaller than ctx_id of two, otherwise false

Definition at line 86 of file w2c_array_trie.hpp.

7.23.2.2 `bool uva::smt::bpbd::server::lm::__W2CArryTrie::operator< (const T_N_GramData & one, const T_N_GramData & two) [inline]`

This is the less operator implementation

Parameters

<i>one</i>	the first object to compare
<i>two</i>	the second object to compare

Returns

true if ctx_id of one is smaller than ctx_id of two, otherwise false

Definition at line 96 of file w2c_array_trie.hpp.

7.24 `uva::smt::bpbd::server::lm::__W2CHybridTrie` Namespace Reference

7.25 `uva::smt::bpbd::server::lm::arpa` Namespace Reference

Classes

- class [lm_basic_builder](#)
- class [lm_gram_builder](#)
- class [lm_gram_builder_factory](#)
- struct [TAddGramFunct](#)

Functions

- [INSTANTIATE_TRIE_BUILDER_FILE_READER \(cstyle_file_reader\)](#)
- [INSTANTIATE_TRIE_BUILDER_FILE_READER \(file_stream_reader\)](#)
- [INSTANTIATE_TRIE_BUILDER_FILE_READER \(memory_mapped_file_reader\)](#)
- [INSTANTIATE_ARPA_GRAM_BUILDER_LEVEL \(M_GRAM_LEVEL_1\)](#)
- [INSTANTIATE_ARPA_GRAM_BUILDER_LEVEL \(M_GRAM_LEVEL_2\)](#)
- [INSTANTIATE_ARPA_GRAM_BUILDER_LEVEL \(M_GRAM_LEVEL_3\)](#)
- [INSTANTIATE_ARPA_GRAM_BUILDER_LEVEL \(M_GRAM_LEVEL_4\)](#)
- [INSTANTIATE_ARPA_GRAM_BUILDER_LEVEL \(M_GRAM_LEVEL_5\)](#)
- [INSTANTIATE_ARPA_GRAM_BUILDER_LEVEL \(M_GRAM_LEVEL_6\)](#)
- [INSTANTIATE_ARPA_GRAM_BUILDER_LEVEL \(M_GRAM_LEVEL_7\)](#)

7.25.1 Function Documentation

- 7.25.1.1 `uva::smt::bpbd::server::lm::arpa::INstantiate_ARPA_Gram_Builder_Level (M_Gram_Level_1)`
- 7.25.1.2 `uva::smt::bpbd::server::lm::arpa::INstantiate_ARPA_Gram_Builder_Level (M_Gram_Level_2)`
- 7.25.1.3 `uva::smt::bpbd::server::lm::arpa::INstantiate_ARPA_Gram_Builder_Level (M_Gram_Level_3)`
- 7.25.1.4 `uva::smt::bpbd::server::lm::arpa::INstantiate_ARPA_Gram_Builder_Level (M_Gram_Level_4)`
- 7.25.1.5 `uva::smt::bpbd::server::lm::arpa::INstantiate_ARPA_Gram_Builder_Level (M_Gram_Level_5)`
- 7.25.1.6 `uva::smt::bpbd::server::lm::arpa::INstantiate_ARPA_Gram_Builder_Level (M_Gram_Level_6)`
- 7.25.1.7 `uva::smt::bpbd::server::lm::arpa::INstantiate_ARPA_Gram_Builder_Level (M_Gram_Level_7)`
- 7.25.1.8 `uva::smt::bpbd::server::lm::arpa::INstantiate_Trie_Builder_File_Reader (cstyle_file_reader)`
- 7.25.1.9 `uva::smt::bpbd::server::lm::arpa::INstantiate_Trie_Builder_File_Reader (file_stream_reader)`
- 7.25.1.10 `uva::smt::bpbd::server::lm::arpa::INstantiate_Trie_Builder_File_Reader (memory_mapped_file_reader)`

7.26 uva::smt::bpbd::server::lm::caching Namespace Reference

Classes

- class [BitmapHashCache](#)

7.27 uva::smt::bpbd::server::lm::dictionary Namespace Reference

Namespaces

- [__AWordIndex](#)
- [__counting_word_index](#)
- [__optimizing_word_index](#)

Classes

- class [aword_index](#)
- class [basic_word_index](#)
- class [counting_word_index](#)
- class [hashing_word_index](#)
- class [optimizing_word_index](#)

Typedefs

- typedef [optimizing_word_index](#)< [basic_word_index](#) > [basic_optimizing_word_index](#)
- typedef [optimizing_word_index](#)< [counting_word_index](#) > [counting_optimizing_word_index](#)

7.27.1 Typedef Documentation

7.27.1.1 `typedef optimizing_word_index<basic_word_index> uva::smt::bpbd::server::lm::dictionary↔
::basic_optimizing_word_index`

Definition at line 414 of file `optimizing_word_index.hpp`.

7.27.1.2 `typedef optimizing_word_index<counting_word_index> uva::smt::bpbd::server::lm::dictionary↔
::counting_optimizing_word_index`

Definition at line 415 of file `optimizing_word_index.hpp`.

7.28 uva::smt::bpbd::server::lm::dictionary::__AWordIndex Namespace Reference

7.29 uva::smt::bpbd::server::lm::dictionary::__counting_word_index Namespace Reference

Classes

- struct [TWordInfo](#)

Functions

- bool [operator<](#) (const [TWordInfo](#) &one, const [TWordInfo](#) &two)

7.29.1 Function Documentation

7.29.1.1 `bool uva::smt::bpbd::server::lm::dictionary::__counting_word_index::operator< (const TWordInfo & one, const TWordInfo & two) [inline]`

The comparison operator for two word info objects, the one that is smaller has the highest word probability.

Parameters

<i>one</i>	the first object to compare
<i>two</i>	the second object to compare

Returns

the smaller one is the most used one, with the higher word probability

Definition at line 68 of file `counting_word_index.hpp`.

7.30 uva::smt::bpbd::server::lm::dictionary::__optimizing_word_index Namespace Reference

Classes

- struct [word_index_bucket_entry](#)

Functions

- `template<typename word_id_type > struct uva::smt::bpbd::server::lm::dictionary::__optimizing_word_index::word_index_bucket_entry __attribute__((packed))`

7.30.1 Function Documentation

- 7.30.1.1 `template<typename word_id_type > struct uva::smt::bpbd::server::lm::dictionary::__optimizing_word_index::word_index_bucket_entry uva::smt::bpbd::server::lm::dictionary::__optimizing_word_index::__attribute__((packed))`

7.31 uva::smt::bpbd::server::lm::identifiers Namespace Reference

Typedefs

- `typedef uint32_t TShortId`
- `typedef uint64_t TLongId`

7.31.1 Detailed Description

This namespace stores types and constants for the m-gram and context identifiers.

Todo Go through all the LM and change from TShortId and TLongId to phrase_uid, word_uid and basic types!

7.31.2 Typedef Documentation

- 7.31.2.1 `typedef uint64_t uva::smt::bpbd::server::lm::identifiers::TLongId`

Definition at line 75 of file lm_consts.hpp.

- 7.31.2.2 `typedef uint32_t uva::smt::bpbd::server::lm::identifiers::TShortId`

Definition at line 73 of file lm_consts.hpp.

7.32 uva::smt::bpbd::server::lm::m_grams Namespace Reference

Namespaces

- `m_gram_id`

Classes

- `struct m_gram_payload_s`
- `class model_m_gram`
- `class phrase_base`
- `class query_m_gram`

Typedefs

- `typedef m_gram_payload_s m_gram_payload`

Functions

- ostream & [operator<<](#) (ostream &stream, const [model_m_gram](#) &gram)
- ostream & [operator<<](#) (ostream &stream, const [query_m_gram](#) &gram)

7.32.1 Typedef Documentation

7.32.1.1 typedef m_gram_payload_s uva::smt::bpbd::server::lm::m_grams::m_gram_payload

Definition at line 54 of file m_gram_payload.hpp.

7.32.2 Function Documentation

7.32.2.1 ostream& uva::smt::bpbd::server::lm::m_grams::operator<< (ostream & *stream*, const [model_m_gram](#) & *gram*)

Allows to serialize the m-gram to the output stream as a string

Parameters

<i>stream</i>	the reference to the stream to output into
<i>gram</i>	the m-gram object to output

Returns

the reference to the stream

Definition at line 44 of file model_m_gram.cpp.

7.32.2.2 ostream& uva::smt::bpbd::server::lm::m_grams::operator<< (ostream & *stream*, const [query_m_gram](#) & *gram*)

Allows to serialize the m-gram to the output stream as a string

Parameters

<i>stream</i>	the reference to the stream to output into
<i>gram</i>	the m-gram object to output

Returns

the reference to the stream

Definition at line 44 of file query_m_gram.cpp.

7.33 uva::smt::bpbd::server::lm::m_grams::m_gram_id Namespace Reference

Classes

- class [Byte_M_Gram_Id](#)
- struct [T_Gram_Id_Key](#)

Typedefs

- typedef uint8_t * [TM_Gram_Id_Value_Ptr](#)

7.33.1 Detailed Description

This namespace stores some generic macros and functions for the m-gram id. The ones stored here are not made part of the byte-m-gram-id structure as they are generic and can be used in other m-gram ids.

7.33.2 Typedef Documentation

7.33.2.1 `typedef uint8_t* uva::smt::bpbd::server::lm::m_grams::m_gram_id::TM_Gram_Id_Value_Ptr`

Definition at line 60 of file `m_gram_id.hpp`.

7.34 `uva::smt::bpbd::server::lm::proxy` Namespace Reference

Classes

- class [lm_fast_query_proxy](#)
- class [lm_fast_query_proxy_local](#)
- class [lm_proxy](#)
- class [lm_proxy_local](#)
- class [lm_slow_query_proxy](#)
- class [lm_slow_query_proxy_local](#)

7.35 `uva::smt::bpbd::server::rm` Namespace Reference

Namespaces

- [builders](#)
- [models](#)
- [proxy](#)

Classes

- class [rm_configurator](#)
- struct [rm_parameters](#)

Typedefs

- typedef [rm_basic_model](#) [rm_model_type](#)
- typedef [cstyle_file_reader](#) [rm_model_reader](#)
- typedef [rm_basic_builder](#)< [rm_model_type](#), [rm_model_reader](#) > [rm_builder_type](#)

7.35.1 Typedef Documentation

7.35.1.1 `typedef rm_basic_builder<rm_model_type, rm_model_reader> uva::smt::bpbd::server::rm::rm_builder_type`

Definition at line 57 of file `rm_configs.hpp`.

7.35.1.2 `typedef cstyle_file_reader uva::smt::bpbd::server::rm::rm_model_reader`

Definition at line 54 of file `rm_configs.hpp`.

7.35.1.3 `typedef rm_basic_model uva::smt::bpbd::server::rm::rm_model_type`

Definition at line 51 of file `rm_configs.hpp`.

7.36 `uva::smt::bpbd::server::rm::builders` Namespace Reference

Classes

- class [rm_basic_builder](#)

7.37 `uva::smt::bpbd::server::rm::models` Namespace Reference

Namespaces

- [__rm_basic_model](#)

Classes

- class [rm_basic_model](#)
- class [rm_entry_temp](#)
- class [rm_query](#)

Typedefs

- typedef [rm_entry_temp](#)< NUM_RM_FEATURES > [rm_entry](#)

Enumerations

- enum [reordering_orientation](#) {
[UNKNOWN_ORIENT](#) = 0, [MONOTONE_ORIENT](#) = [UNKNOWN_ORIENT](#) + 1, [SWAP_ORIENT](#) = [MONOTONE_ORIENT](#) + 1, [DISCONT_LEFT_ORIENT](#) = [SWAP_ORIENT](#) + 1,
[DISCONT_RIGHT_ORIENT](#) = [DISCONT_LEFT_ORIENT](#) + 1, [size](#) = [DISCONT_RIGHT_ORIENT](#) + 1 }

7.37.1 Typedef Documentation

7.37.1.1 `typedef rm_entry_temp<NUM_RM_FEATURES> uva::smt::bpbd::server::rm::models::rm_entry`

Definition at line 189 of file `rm_entry.hpp`.

7.37.2 Enumeration Type Documentation

7.37.2.1 `enum uva::smt::bpbd::server::rm::models::reordering_orientation`

Defined the reordering orientations in the lexicolized model

Enumerator

`UNKNOWN_ORIENT`
`MONOTONE_ORIENT`
`SWAP_ORIENT`
`DISCONT_LEFT_ORIENT`
`DISCONT_RIGHT_ORIENT`
`size`

Definition at line 53 of file `rm_entry.hpp`.

7.38 `uva::smt::bpbd::server::rm::models::__rm_basic_model` Namespace Reference

7.39 `uva::smt::bpbd::server::rm::proxy` Namespace Reference

Classes

- class [`rm_proxy`](#)
- class [`rm_proxy_local`](#)
- class [`rm_query_proxy`](#)
- class [`rm_query_proxy_local`](#)

7.40 `uva::smt::bpbd::server::task_id` Namespace Reference

7.41 `uva::smt::bpbd::server::tm` Namespace Reference

Namespaces

- [`builders`](#)
- [`models`](#)
- [`proxy`](#)

Classes

- class [`tm_configurator`](#)
- struct [`tm_parameters`](#)

Typedefs

- typedef [`tm_basic_model`](#) [`tm_model_type`](#)
- typedef [`cstyle_file_reader`](#) [`tm_model_reader`](#)
- typedef [`tm_basic_builder`](#)< [`tm_model_type`](#), [`tm_model_reader`](#) > [`tm_builder_type`](#)

7.41.1 Typedef Documentation

7.41.1.1 typedef `tm_basic_builder`<`tm_model_type`, `tm_model_reader`> `uva::smt::bpbd::server::tm::tm_builder_type`

Definition at line 57 of file `tm_configs.hpp`.

7.41.1.2 `typedef cstyle_file_reader uva::smt::bpbd::server::tm::tm_model_reader`

Definition at line 54 of file `tm_configs.hpp`.

7.41.1.3 `typedef tm_basic_model uva::smt::bpbd::server::tm::tm_model_type`

Definition at line 51 of file `tm_configs.hpp`.

7.42 `uva::smt::bpbd::server::tm::builders` Namespace Reference

Classes

- class [tm_basic_builder](#)

Typedefs

- typedef `unordered_map< phrase_uid, size_t >` [sizes_map](#)

7.42.1 Typedef Documentation

7.42.1.1 `typedef unordered_map<phrase_uid, size_t> uva::smt::bpbd::server::tm::builders::sizes_map`

Definition at line 73 of file `tm_basic_builder.hpp`.

7.43 `uva::smt::bpbd::server::tm::models` Namespace Reference

Namespaces

- [__tm_basic_model](#)

Classes

- class [tm_basic_model](#)
- class [tm_query](#)
- class [tm_source_entry](#)
- class [tm_target_entry_temp](#)

Typedefs

- typedef `const tm_source_entry` [tm_const_source_entry](#)
- typedef `tm_const_source_entry * tm_const_source_entry_ptr`
- typedef `tm_source_entry * tm_source_entry_ptr`
- typedef `tm_target_entry_temp< NUM_TM_FEATURES >` [tm_target_entry](#)
- typedef `const tm_target_entry` [tm_const_target_entry](#)
- typedef `prob_weight feature_array[tm_target_entry::NUM_FEATURES]`

7.43.1 Typedef Documentation

7.43.1.1 `typedef prob_weight uva::smt::bpbd::server::tm::models::feature_array[tm_target_entry::NUM_FEATURES]`

Definition at line 244 of file `tm_target_entry.hpp`.

7.43.1.2 `typedef const tm_source_entry uva::smt::bpbd::server::tm::models::tm_const_source_entry`

Definition at line 270 of file `tm_source_entry.hpp`.

7.43.1.3 `typedef tm_const_source_entry* uva::smt::bpbd::server::tm::models::tm_const_source_entry_ptr`

Definition at line 273 of file `tm_source_entry.hpp`.

7.43.1.4 `typedef const tm_target_entry uva::smt::bpbd::server::tm::models::tm_const_target_entry`

Definition at line 241 of file `tm_target_entry.hpp`.

7.43.1.5 `typedef tm_source_entry* uva::smt::bpbd::server::tm::models::tm_source_entry_ptr`

Definition at line 276 of file `tm_source_entry.hpp`.

7.43.1.6 `typedef tm_target_entry_temp<NUM_TM_FEATURES> uva::smt::bpbd::server::tm::models::tm_target_entry`

Definition at line 238 of file `tm_target_entry.hpp`.

7.44 `uva::smt::bpbd::server::tm::models::__tm_basic_model` Namespace Reference

7.45 `uva::smt::bpbd::server::tm::proxy` Namespace Reference

Classes

- class [tm_proxy](#)
- class [tm_proxy_local](#)
- class [tm_query_proxy](#)
- class [tm_query_proxy_local](#)

7.46 `uva::utils` Namespace Reference

Namespaces

- [containers](#)
- [exceptions](#)
- [file](#)
- [hashing](#)
- [logging](#)
- [math](#)
- [monitor](#)

- [text](#)
- [threads](#)

7.47 uva::utils::containers Namespace Reference

Namespaces

- [alloc](#)
- [utils](#)

Classes

- class [circular_queue](#)
- class [dynamic_stack_array](#)
- struct [ELEMENT_DEALLOC_FUNC](#)
- class [fixed_size_hashmap](#)
- class [greedy_memory_storage](#)
- class [mem_increase_strategy](#)
- class [upp_diag_matrix](#)

Typedefs

- typedef std::function< size_t(const size_t) > [TCapacityIncFunct](#)

Enumerations

- enum [mem_inc_types_enum](#) {
[UNDEFINED](#) = 0, [CONSTANT](#) = [UNDEFINED](#) + 1, [LINEAR](#) = [CONSTANT](#) + 1, [LOG_2](#) = [LINEAR](#) + 1,
[LOG_10](#) = [LOG_2](#) + 1, [size](#) = [LOG_10](#) + 1 }

Functions

- [mem_increase_strategy](#) [get_mem_incr_strat](#) (const [mem_inc_types_enum](#) stype, const size_t min_mem_
inc, const size_t mem_inc_factor)

Variables

- const char *const [_memIncTypesEnumStr](#) [[mem_inc_types_enum::size](#)] = {"CONSTANT", "[LINEAR](#)", "[LOG_2](#)", "[LOG_10](#)"}

7.47.1 Typedef Documentation

7.47.1.1 typedef std::function<size_t(const size_t) > uva::utils::containers::TCapacityIncFunct

This is a function type for the function that should compute the capacity increase

Parameters

<i>the</i>	first argument is the current capacity as float
------------	---

Returns

the capacity increase

Definition at line 63 of file dynamic_memory_arrays.hpp.

7.47.2 Enumeration Type Documentation**7.47.2.1 enum uva::utils::containers::mem_inc_types_enum**

Stores the possible memory increase types

Enumerator

UNDEFINED

CONSTANT

LINEAR

LOG_2

LOG_10

size

Definition at line 49 of file dynamic_memory_arrays.hpp.

7.47.3 Function Documentation**7.47.3.1 mem_increase_strategy uva::utils::containers::get_mem_incr_strat (const mem_inc_types_enum stype, const size_t min_mem_inc, const size_t mem_inc_factor) [inline]**

This is a factory function allowing to ge the strategy object for the given parameters.

Todo Optimize the switch, it is pretty ugly, use a map or something.

Parameters

<i>stype</i>	the strategy type
<i>min_mem_inc</i>	the minimum memory increment in number of elements
<i>mem_inc_factor</i>	the memory increment factor, the number we will multiply by the computed increment

Returns

the pointer to a newly allocated strategy object

Definition at line 147 of file dynamic_memory_arrays.hpp.

7.47.4 Variable Documentation**7.47.4.1 const char* const uva::utils::containers::_memIncTypesEnumStr[mem_inc_types_enum::size] = {"CONSTANT", "LINEAR", "LOG_2", "LOG_10"}**

Stores the string names of the memory increase strategies, should correspond with the enum MemIncTypesEnum indexes!

Definition at line 69 of file dynamic_memory_arrays.hpp.

7.48 uva::utils::containers::alloc Namespace Reference

Classes

- class [greedy_memory_allocator](#)

Functions

- `template<typename TContainer , typename TAllocator >`
`void allocate_container (TContainer **ppContainer, TAllocator **ppAllocator, const size_t numEntries, const string ctName, const float factor=UNORDERED_MAP_MEMORY_FACTOR)`
- `template<typename TContainer , typename TAllocator >`
`void reserve_mem_unordered_map (TContainer **ppContainer, TAllocator **ppAllocator, const size_t numEntries, const string ctName, const float factor=UNORDERED_MAP_MEMORY_FACTOR)`
- `template<typename TContainer , typename TAllocator >`
`void deallocate_container (TContainer **ppContainer, TAllocator **ppAllocator)`
- `template<typename T , typename U >`
`bool operator== (const greedy_memory_allocator< T > &, const greedy_memory_allocator< U > &)`
- `template<typename T >`
`bool operator== (const greedy_memory_allocator< T > &, const greedy_memory_allocator< T > &)`
- `template<typename T , typename U >`
`bool operator!= (const greedy_memory_allocator< T > &, const greedy_memory_allocator< U > &)`
- `template<typename T >`
`bool operator!= (const greedy_memory_allocator< T > &, const greedy_memory_allocator< T > &)`

7.48.1 Function Documentation

- 7.48.1.1 `template<typename TContainer , typename TAllocator > void uva::utils::containers::alloc::allocate_container (TContainer ** ppContainer, TAllocator ** ppAllocator, const size_t numEntries, const string ctName, const float factor = UNORDERED_MAP_MEMORY_FACTOR)`

This is helper function that allows to allocate the container, allocator and the actual data storage Note that, this functions is meant to be used with the unordered_map allocator

Parameters

<i>ppContainer</i>	the pointer to the container pointer
<i>ppAllocator</i>	the pointer to the allocator pointer
<i>numEntries</i>	the number of entries to pre-allocate for
<i>ctName</i>	the container name for logging purposes
<i>factor</i>	the memory multiplication factor, default is UNORDERED_MAP_MEMORY_FACTOR. This is how many times memory we will allocate (than needed to store numEntries elems)

Definition at line 65 of file greedy_memory_allocator.hpp.

- 7.48.1.2 `template<typename TContainer , typename TAllocator > void uva::utils::containers::alloc::deallocate_container (TContainer ** ppContainer, TAllocator ** ppAllocator)`

This is helper function that allows to deallocate the container allocator and actual data storage

Parameters

<i>ppContainer</i>	the pointer to the container pointer
--------------------	--------------------------------------

<i>ppAllocator</i>	the pointer to the allocator pointer
<i>ppStorage</i>	the pointer to the storage pointer

Definition at line 113 of file greedy_memory_allocator.hpp.

7.48.1.3 `template<typename T , typename U > bool uva::utils::containers::alloc::operator!= (const greedy_memory_allocator< T > & , const greedy_memory_allocator< U > &)`

Definition at line 311 of file greedy_memory_allocator.hpp.

7.48.1.4 `template<typename T > bool uva::utils::containers::alloc::operator!= (const greedy_memory_allocator< T > & , const greedy_memory_allocator< T > &)`

Definition at line 316 of file greedy_memory_allocator.hpp.

7.48.1.5 `template<typename T , typename U > bool uva::utils::containers::alloc::operator== (const greedy_memory_allocator< T > & , const greedy_memory_allocator< U > &)`

Definition at line 301 of file greedy_memory_allocator.hpp.

7.48.1.6 `template<typename T > bool uva::utils::containers::alloc::operator== (const greedy_memory_allocator< T > & , const greedy_memory_allocator< T > &)`

Definition at line 306 of file greedy_memory_allocator.hpp.

7.48.1.7 `template<typename TContainer , typename TAllocator > void uva::utils::containers::alloc::reserve_mem_unordered_map (TContainer ** ppContainer, TAllocator ** ppAllocator, const size_t numEntries, const string ctName, const float factor = UNORDERED_MAP_MEMORY_FACTOR)`

This is helper function that allows to allocate the container, allocator and the actual data storage Note that, this functions is meant to be used with the unordered_map allocator

Parameters

<i>ppContainer</i>	the pointer to the container pointer
<i>ppAllocator</i>	the pointer to the allocator pointer
<i>numEntries</i>	the number of entries to pre-allocate for
<i>ctName</i>	the container name for logging purposes
<i>factor</i>	the memory multiplication factor, default is UNORDERED_MAP_MEMORY_FACTOR. This is how many times memory we will allocate (than needed to store numEntries elems)

Definition at line 95 of file greedy_memory_allocator.hpp.

7.49 uva::utils::containers::utils Namespace Reference

Classes

- struct [T_IS_COMPARE_FUNC](#)

Functions

- `template<typename ARR_ELEM_TYPE >`

- ```
bool my_bsearch_id (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const typename ARR_ELEM_TYPE::TidType key, const ARR_ELEM_TYPE *&found_elem)
```
- `template<typename ARR_ELEM_TYPE , typename IDX_TYPE , typename KEY_TYPE >`  
`bool my_bsearch_id (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const KEY_TYPE key, IDX_TYPE &found_pos)`
  - `template<typename ARR_ELEM_TYPE >`  
`bool my_bsearch_wordId_ctxId (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const uint32_t key1, const uint32_t key2, uint32_t &found_pos)`
  - `template<typename ARR_ELEM_TYPE , typename KEY_TYPE >`  
`bool my_isearch_id (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const KEY_TYPE key, const ARR_ELEM_TYPE *&found_elem)`
  - `template<typename ARR_ELEM_TYPE , typename INDEX_TYPE , typename KEY_TYPE >`  
`bool my_bsearch (const ARR_ELEM_TYPE *array, INDEX_TYPE l_idx, INDEX_TYPE u_idx, const KEY_TYPE key, INDEX_TYPE &mid_pos)`
  - `template<typename ARR_ELEM_TYPE >`  
`bool my_isearch_id (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const typename ARR_ELEM_TYPE::TidType key, const ARR_ELEM_TYPE *&found_elem)`
  - `template<typename ELEM_TYPE >`  
`void my_sort (ELEM_TYPE *array_begin, const uint32_t array_size, typename T_IS_COMPARE_FUNC< ELEM_TYPE >::func_type is_less_func)`
  - `template<typename ELEM_TYPE , typename T_IS_COMPARE_FUNC< ELEM_TYPE >::func_ptr IS_LESS_FUNC>`  
`void my_sort (ELEM_TYPE *array_begin, const uint32_t array_size)`
  - `template<typename ELEM_TYPE , bool IS_PROGRESS = true>`  
`bool is_less (const ELEM_TYPE &first, const ELEM_TYPE &second)`

### 7.49.1 Function Documentation

7.49.1.1 `template<typename ELEM_TYPE , bool IS_PROGRESS = true> bool uva::utils::containers::utils::is_less ( const ELEM_TYPE & first, const ELEM_TYPE & second ) [inline]`

The basic "is less" function for the sort algorithms that allows to update the progress bar.

#### Parameters

|               |                               |
|---------------|-------------------------------|
| <i>first</i>  | the first element to compare  |
| <i>second</i> | the second element to compare |

#### Returns

true if the first element is less then the second

Definition at line 429 of file array\_utils.hpp.

7.49.1.2 `template<typename ARR_ELEM_TYPE , typename INDEX_TYPE , typename KEY_TYPE > bool uva::utils::containers::utils::my_bsearch ( const ARR_ELEM_TYPE * array, INDEX_TYPE l_idx, INDEX_TYPE u_idx, const KEY_TYPE key, INDEX_TYPE & mid_pos )`

This is a search algorithm for some ordered array, here we use bsearch from <cstdlib>

#### Parameters

|              |                                             |
|--------------|---------------------------------------------|
| <i>array</i> | the pointer to the first array element      |
| <i>l_idx</i> | the initial left border index for searching |

|                |                                                               |
|----------------|---------------------------------------------------------------|
| <i>u_idx</i>   | the initial right border index for searching                  |
| <i>key</i>     | the key we are searching for                                  |
| <i>mid_pos</i> | the out parameter that stores the found element index, if any |

**Returns**

true if the element was found, otherwise false

**Exceptions**

|                  |                                                                                       |
|------------------|---------------------------------------------------------------------------------------|
| <i>Exception</i> | in case ( <i>l_idx</i> < 0)    ( <i>l_idx</i> > <i>u_idx</i> ), with sanity checks on |
|------------------|---------------------------------------------------------------------------------------|

Definition at line 295 of file array\_utils.hpp.

```
7.49.1.3 template<typename ARR_ELEM_TYPE > bool uva::utils::containers::utils::my_bsearch_id (const ARR_ELEM_TYPE
* array, int64_t l_idx, int64_t u_idx, const typename ARR_ELEM_TYPE::TIdType key, const ARR_ELEM_TYPE *&
found_elem) [inline]
```

This is a binary search algorithm for some ordered array

**Parameters**

|                                   |                                                                                                                         |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <i>ARR_ELEM_T</i> ↔<br><i>YPE</i> | the array element structure, must have <i>ctx_id</i> field as this method will specifically use it to compare elements. |
| <i>IDX_TYPE</i>                   | the index type                                                                                                          |
| <i>KEY_TYPE</i>                   | the key type template parameter                                                                                         |
| <i>array</i>                      | the pointer to the first array element                                                                                  |
| <i>l_idx</i>                      | the initial left border index for searching                                                                             |
| <i>u_idx</i>                      | the initial right border index for searching                                                                            |
| <i>key</i>                        | the key we are searching for                                                                                            |
| <i>found_pos</i>                  | the out parameter that stores the found element index, if any                                                           |

**Returns**

true if the element was found, otherwise false

**Exceptions**

|                  |                                                                                       |
|------------------|---------------------------------------------------------------------------------------|
| <i>Exception</i> | in case ( <i>l_idx</i> < 0)    ( <i>l_idx</i> > <i>u_idx</i> ), with sanity checks on |
|------------------|---------------------------------------------------------------------------------------|

Definition at line 180 of file array\_utils.hpp.

```
7.49.1.4 template<typename ARR_ELEM_TYPE , typename IDX_TYPE , typename KEY_TYPE > bool
uva::utils::containers::utils::my_bsearch_id (const ARR_ELEM_TYPE * array, int64_t l_idx, int64_t u_idx, const
KEY_TYPE key, IDX_TYPE & found_pos) [inline]
```

This is a binary search algorithm for some ordered array

**Parameters**

|                                   |                                                                                                                         |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <i>ARR_ELEM_T</i> ↔<br><i>YPE</i> | the array element structure, must have <i>ctx_id</i> field as this method will specifically use it to compare elements. |
| <i>IDX_TYPE</i>                   | the index type                                                                                                          |
| <i>KEY_TYPE</i>                   | the key type template parameter                                                                                         |

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| <i>array</i>     | the pointer to the first array element                        |
| <i>l_idx</i>     | the initial left border index for searching                   |
| <i>u_idx</i>     | the initial right border index for searching                  |
| <i>key</i>       | the key we are searching for                                  |
| <i>found_pos</i> | the out parameter that stores the found element index, if any |

**Returns**

true if the element was found, otherwise false

**Exceptions**

|                  |                                                                                       |
|------------------|---------------------------------------------------------------------------------------|
| <i>Exception</i> | in case ( <i>l_idx</i> < 0)    ( <i>l_idx</i> > <i>u_idx</i> ), with sanity checks on |
|------------------|---------------------------------------------------------------------------------------|

Definition at line 200 of file array\_utils.hpp.

```
7.49.1.5 template<typename ARR_ELEM_TYPE > bool uva::utils::containers::utils::my_bsearch_wordId_ctxId (const
 ARR_ELEM_TYPE * array, int64_t l_idx, int64_t u_idx, const uint32_t key1, const uint32_t key2, uint32_t & found_pos
) [inline]
```

This is a binary search algorithm for some ordered array for two keys

**Parameters**

|                      |                                                                                                                   |
|----------------------|-------------------------------------------------------------------------------------------------------------------|
| <i>ARR_ELEM_TYPE</i> | the array element structure, must have word_id field as this method will specifically use it to compare elements. |
| <i>array</i>         | the pointer to the first array element                                                                            |
| <i>l_idx</i>         | the initial left border index for searching                                                                       |
| <i>u_idx</i>         | the initial right border index for searching                                                                      |
| <i>key</i>           | the key we are searching for                                                                                      |
| <i>found_pos</i>     | the out parameter that stores the found element index, if any                                                     |

**Returns**

true if the element was found, otherwise false

**Exceptions**

|                  |                                                                                       |
|------------------|---------------------------------------------------------------------------------------|
| <i>Exception</i> | in case ( <i>l_idx</i> < 0)    ( <i>l_idx</i> > <i>u_idx</i> ), with sanity checks on |
|------------------|---------------------------------------------------------------------------------------|

Definition at line 216 of file array\_utils.hpp.

```
7.49.1.6 template<typename ARR_ELEM_TYPE , typename KEY_TYPE > bool uva::utils::containers::utils::my_isearch_id (
 const ARR_ELEM_TYPE * array, int64_t l_idx, int64_t u_idx, const KEY_TYPE key, const ARR_ELEM_TYPE *&
 found_elem)
```

This is an interpolated search algorithm for some ordered array WARNING: IS ACTUALLY VERT SLOW at least in the current implementation and for the current application!

**Parameters**

|                      |                                                                                                                  |
|----------------------|------------------------------------------------------------------------------------------------------------------|
| <i>ARR_ELEM_TYPE</i> | the array element structure, must have ctx_id field as this method will specifically use it to compare elements. |
| <i>IDX_TYPE</i>      | the index type                                                                                                   |

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| <i>KEY_TYPE</i>  | the key type template parameter                               |
| <i>array</i>     | the pointer to the first array element                        |
| <i>l_idx</i>     | the initial left border index for searching                   |
| <i>u_idx</i>     | the initial right border index for searching                  |
| <i>key</i>       | the key we are searching for                                  |
| <i>found_pos</i> | the out parameter that stores the found element index, if any |

**Returns**

true if the element was found, otherwise false

**Exceptions**

|                  |                                                                                       |
|------------------|---------------------------------------------------------------------------------------|
| <i>Exception</i> | in case ( <i>l_idx</i> < 0)    ( <i>l_idx</i> > <i>u_idx</i> ), with sanity checks on |
|------------------|---------------------------------------------------------------------------------------|

Definition at line 235 of file array\_utils.hpp.

```
7.49.1.7 template<typename ARR_ELEM_TYPE > bool uva::utils::containers::utils::my_lsearch_id (const ARR_ELEM_TYPE *
 array, int64_t l_idx, int64_t u_idx, const typename ARR_ELEM_TYPE::TIdType key, const ARR_ELEM_TYPE *&
 found_elem) [inline]
```

This is a linear search algorithm for some ordered array

**Parameters**

|                                 |                                                               |
|---------------------------------|---------------------------------------------------------------|
| <i>ARR_ELEM_T</i><br><i>YPE</i> | the array element structure                                   |
| <i>IDX_TYPE</i>                 | the index type                                                |
| <i>KEY_TYPE</i>                 | the key type template parameter                               |
| <i>array</i>                    | the pointer to the first array element                        |
| <i>l_idx</i>                    | the initial left border index for searching                   |
| <i>u_idx</i>                    | the initial right border index for searching                  |
| <i>key</i>                      | the key we are searching for                                  |
| <i>found_pos</i>                | the out parameter that stores the found element index, if any |

**Returns**

true if the element was found, otherwise false

**Exceptions**

|                  |                                                                                       |
|------------------|---------------------------------------------------------------------------------------|
| <i>Exception</i> | in case ( <i>l_idx</i> < 0)    ( <i>l_idx</i> > <i>u_idx</i> ), with sanity checks on |
|------------------|---------------------------------------------------------------------------------------|

Definition at line 355 of file array\_utils.hpp.

```
7.49.1.8 template<typename ELEM_TYPE > void uva::utils::containers::utils::my_sort (ELEM_TYPE * array_begin,
 const uint32_t array_size, typename T_IS_COMPARE_FUNC< ELEM_TYPE >::func_type is_less_func)
 [inline]
```

This method is used to do <algorithm> std::sort on an array of structures convertible to some simple comparable type. This method does the progress bar update, if needed

**Parameters**

|                  |                        |
|------------------|------------------------|
| <i>ELEM_TYPE</i> | the array element type |
|------------------|------------------------|

|                     |                                          |
|---------------------|------------------------------------------|
| <i>array_begin</i>  | the pointer to the array's first element |
| <i>array_size</i>   | the size of the array                    |
| <i>is_less_func</i> | the is-less function                     |

Definition at line 395 of file array\_utils.hpp.

```
7.49.1.9 template<typename ELEM_TYPE , typename T_IS_COMPARE_FUNC< ELEM_TYPE >::func_ptr IS_LESS_FUNC>
void uva::utils::containers::utils::my_sort (ELEM_TYPE * array_begin, const uint32_t array_size) [inline]
```

This method is used to do <algorithm> std::sort on an array of structures convertible to some simple comparable type. This method does the progress bar update, if needed

#### Parameters

|                     |                                          |
|---------------------|------------------------------------------|
| <i>ELEM_TYPE</i>    | the array element type                   |
| <i>IS_LESS_FUNC</i> | the is-less function                     |
| <i>array_begin</i>  | the pointer to the array's first element |
| <i>array_size</i>   | the size of the array                    |

This method is used to do <algorithm> std::sort on an array of structures convertible to some simple comparable type. This method does the progress bar update, if needed

#### Parameters

|                    |                                                                          |
|--------------------|--------------------------------------------------------------------------|
| <i>ELEM_TYPE</i>   | the array element type                                                   |
| <i>IS_PROGRESS</i> | if true the progress bar will be updated, otherwise not, default is true |
| <i>array_begin</i> | the pointer to the array's first element                                 |
| <i>array_size</i>  | the size of the array                                                    |

Definition at line 414 of file array\_utils.hpp.

## 7.50 uva::utils::exceptions Namespace Reference

### Classes

- class [uva\\_exception](#)

### Variables

- constexpr bool [DO\\_SANITY\\_CHECKS](#) = false

### 7.50.1 Variable Documentation

```
7.50.1.1 constexpr bool uva::utils::exceptions::DO_SANITY_CHECKS = false
```

Definition at line 42 of file exceptions.hpp.

## 7.51 uva::utils::file Namespace Reference

### Classes

- class [afile\\_reader](#)
- class [cstyle\\_file\\_reader](#)
- class [file\\_stream\\_reader](#)

- class [memory\\_mapped\\_file\\_reader](#)
- class [text\\_piece\\_reader](#)

## Functions

- ostream & [operator<<](#) (ostream &output, const [text\\_piece\\_reader](#) &val)
- template<size\_t NUM\_TOKENS> string [tokens\\_to\\_string](#) (const [text\\_piece\\_reader](#) tokens[NUM\_TOKENS], const size\_t begin\_idx, const size\_t end\_idx)

### 7.51.1 Function Documentation

7.51.1.1 ostream& uva::utils::file::operator<< ( ostream & *output*, const [text\\_piece\\_reader](#) & *val* ) `[inline]`

Overloading the output operator for the ostream

Parameters

|               |                        |
|---------------|------------------------|
| <i>output</i> | the stream to print to |
| <i>val</i>    | the value to print     |

Returns

the output stream

Definition at line 561 of file [text\\_piece\\_reader.hpp](#).

7.51.1.2 template<size\_t NUM\_TOKENS> string uva::utils::file::tokens\_to\_string ( const [text\\_piece\\_reader](#) *tokens*[NUM\_TOKENS], const size\_t *begin\_idx*, const size\_t *end\_idx* ) `[inline]`

This function allows to convert the BasicTextFileReader elements tokens into a array string representation.

Parameters

|                 |                     |
|-----------------|---------------------|
| <i>tokens</i>   | the tokens to print |
| <i>from_idx</i> | the from index      |
| <i>to_idx</i>   | the to index        |

Returns

the resulting string

Definition at line 573 of file [text\\_piece\\_reader.hpp](#).

## 7.52 uva::utils::hashing Namespace Reference

## 7.53 uva::utils::logging Namespace Reference

### Classes

- class [logger](#)
- struct [logging\\_synch](#)

## Enumerations

- enum `debug_levels_enum` {  
`ERROR` = 0, `WARNING` = `ERROR` + 1, `USAGE` = `WARNING` + 1, `RESULT` = `USAGE` + 1,  
`INFO` = `RESULT` + 1, `INFO1` = `INFO` + 1, `INFO2` = `INFO1` + 1, `INFO3` = `INFO2` + 1,  
`DEBUG` = `INFO3` + 1, `DEBUG1` = `DEBUG` + 1, `DEBUG2` = `DEBUG1` + 1, `DEBUG3` = `DEBUG2` + 1,  
`DEBUG4` = `DEBUG3` + 1, `size` = `DEBUG4` + 1 }

## Functions

- `std::ostream & operator<<` (`std::ostream &stream`, `const unsigned char &value`)
- `std::ostream & operator<<` (`std::ostream &stream`, `const signed char &value`)

### 7.53.1 Enumeration Type Documentation

#### 7.53.1.1 enum `uva::utils::logging::debug_levels_enum`

This enumeration stores all the available logging levels.

Enumerator

***ERROR***  
***WARNING***  
***USAGE***  
***RESULT***  
***INFO***  
***INFO1***  
***INFO2***  
***INFO3***  
***DEBUG***  
***DEBUG1***  
***DEBUG2***  
***DEBUG3***  
***DEBUG4***  
***size***

Definition at line 48 of file `logger.hpp`.

### 7.53.2 Function Documentation

#### 7.53.2.1 `std::ostream & uva::utils::logging::operator<<` ( `std::ostream & stream`, `const unsigned char & value` )

Definition at line 42 of file `logger.cpp`.

#### 7.53.2.2 `std::ostream & uva::utils::logging::operator<<` ( `std::ostream & stream`, `const signed char & value` )

Definition at line 46 of file `logger.cpp`.



## 7.54 uva::utils::math Namespace Reference

### Namespaces

- [bits](#)
- [const\\_expr](#)
- [log2](#)

## 7.55 uva::utils::math::bits Namespace Reference

## 7.56 uva::utils::math::const\_expr Namespace Reference

### Functions

- constexpr double [log2](#) (double value, double pow=0.0)
- constexpr uint64\_t [ceil](#) (double value)
- constexpr uint64\_t [power](#) (uint64\_t value, uint8\_t pow)

### 7.56.1 Function Documentation

7.56.1.1 `constexpr uint64_t uva::utils::math::const_expr::ceil ( double value ) [inline]`

Definition at line 66 of file `math_utils.hpp`.

7.56.1.2 `constexpr double uva::utils::math::const_expr::log2 ( double value, double pow = 0.0 ) [inline]`

This is a limited implementation of log, the argument value must be  $\geq 1$ . The computations are also not exact, if the value of the logarithm is not a natural number then we return the maximum integer smaller than the log value plus 0.5. Also if the value is  $\leq 1.0$  then the result is 0.0

Definition at line 62 of file `math_utils.hpp`.

7.56.1.3 `constexpr uint64_t uva::utils::math::const_expr::power ( uint64_t value, uint8_t pow ) [inline]`

Definition at line 72 of file `math_utils.hpp`.

## 7.57 uva::utils::math::log2 Namespace Reference

## 7.58 uva::utils::monitor Namespace Reference

### Classes

- struct [memory\\_usage](#)
- class [stat\\_monitor](#)

### Typedefs

- typedef [memory\\_usage](#) TMemoryUsage

## Variables

- `const uint32_t BYTES_ONE_MB = 1024u`

### 7.58.1 Typedef Documentation

#### 7.58.1.1 `typedef memory_usage uva::utils::monitor::TMemotyUsage`

Definition at line 60 of file `statistics_monitor.hpp`.

### 7.58.2 Variable Documentation

#### 7.58.2.1 `const uint32_t uva::utils::monitor::BYTES_ONE_MB = 1024u`

Definition at line 99 of file `statistics_monitor.hpp`.

## 7.59 `uva::utils::text` Namespace Reference

## Variables

- `const string UTF8_ASCII_WHITESPACES = u8"\t\f\v\n\r "`
- `const string UTF8_ASCII_PUNCTUATIONS = u8".,?!/\"'@#$$%^&*()[ ]{}_+*=<>~|\\;:"`
- `const char ASCII_SPACE_CHAR = ' '`
- `const string UTF8_SPACE_STRING = u8" "`
- `const string UTF8_EMPTY_STRING = u8""`
- `const string UTF8_NEW_LINE_STRING = u8"\n"`

### 7.59.1 Variable Documentation

#### 7.59.1.1 `const char uva::utils::text::ASCII_SPACE_CHAR = ' '`

Definition at line 87 of file `string_utils.hpp`.

#### 7.59.1.2 `const string uva::utils::text::UTF8_ASCII_PUNCTUATIONS = u8".,?!/\"'@#$$%^&*()[ ]{}_+*=<>~|\\;:"`

Definition at line 85 of file `string_utils.hpp`.

#### 7.59.1.3 `const string uva::utils::text::UTF8_ASCII_WHITESPACES = u8"\t\f\v\n\r "`

Definition at line 83 of file `string_utils.hpp`.

#### 7.59.1.4 `const string uva::utils::text::UTF8_EMPTY_STRING = u8""`

Definition at line 91 of file `string_utils.hpp`.

#### 7.59.1.5 `const string uva::utils::text::UTF8_NEW_LINE_STRING = u8"\n"`

Definition at line 93 of file `string_utils.hpp`.

7.59.1.6 `const string uva::utils::text::UTF8_SPACE_STRING = u8" "`

Definition at line 89 of file `string_utils.hpp`.

## 7.60 uva::utils::threads Namespace Reference

### Typedefs

- `typedef lock_guard< recursive_mutex > recursive_guard`
- `typedef lock_guard< mutex > scoped_guard`
- `typedef unique_lock< mutex > unique_guard`
- `typedef atomic< bool > a_bool_flag`
- `typedef const a_bool_flag & acr_bool_flag`

#### 7.60.1 Typedef Documentation

7.60.1.1 `typedef atomic<bool> uva::utils::threads::a_bool_flag`

Definition at line 51 of file `threads.hpp`.

7.60.1.2 `typedef const a_bool_flag& uva::utils::threads::acr_bool_flag`

Definition at line 54 of file `threads.hpp`.

7.60.1.3 `typedef lock_guard<recursive_mutex> uva::utils::threads::recursive_guard`

Definition at line 42 of file `threads.hpp`.

7.60.1.4 `typedef lock_guard<mutex> uva::utils::threads::scoped_guard`

Definition at line 45 of file `threads.hpp`.

7.60.1.5 `typedef unique_lock<mutex> uva::utils::threads::unique_guard`

Definition at line 48 of file `threads.hpp`.



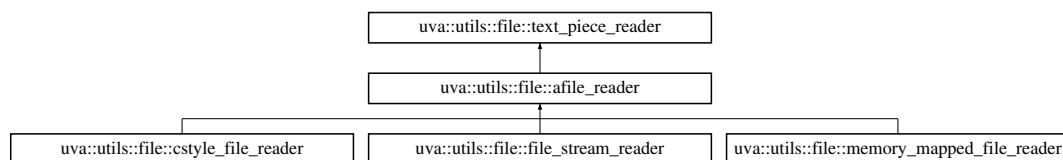
## Chapter 8

# Class Documentation

### 8.1 uva::utils::file::afile\_reader Class Reference

```
#include <afile_reader.hpp>
```

Inheritance diagram for uva::utils::file::afile\_reader:



#### Public Member Functions

- `afile_reader ()`
- `virtual bool is_open () const =0`
- `virtual operator bool () const =0`
- `virtual void log_reader_type_info ()=0`
- `virtual void reset ()`
- `template<const char delim, const uint8_t delim_len = 1> bool get_first (text_piece_reader &out)`
- `template<const char delim, const uint8_t delim_len = 1> bool get_last (text_piece_reader &out)`
- `bool get_first_line (text_piece_reader &out)`
- `bool get_first_space (text_piece_reader &out)`
- `bool get_last_space (text_piece_reader &out)`
- `bool get_first_tab (text_piece_reader &out)`
- `virtual void close ()`
- `virtual ~afile_reader ()`

#### Additional Inherited Members

##### 8.1.1 Detailed Description

This is an abstract base class for the file readers we are going to be using to read model files

Definition at line 45 of file `afile_reader.hpp`.

## 8.1.2 Constructor & Destructor Documentation

### 8.1.2.1 `uva::utils::file::afile_reader::afile_reader ( )` `[inline]`

Definition at line 48 of file `afile_reader.hpp`.

### 8.1.2.2 `virtual uva::utils::file::afile_reader::~~afile_reader ( )` `[inline]`, `[virtual]`

The basic destructor, calls the close method

Definition at line 136 of file `afile_reader.hpp`.

## 8.1.3 Member Function Documentation

### 8.1.3.1 `virtual void uva::utils::file::afile_reader::close ( )` `[inline]`, `[virtual]`

Allows to close the file

Reimplemented in `uva::utils::file::memory_mapped_file_reader`, `uva::utils::file::cstyle_file_reader`, and `uva::utils::file::file_stream_reader`.

Definition at line 130 of file `afile_reader.hpp`.

### 8.1.3.2 `template<const char delim, const uint8_t delim_len = 1> bool uva::utils::file::afile_reader::get_first ( text_piece_reader & out )` `[inline]`

This function searches forward for the first occurrence of the argument delimiter symbol.

Definition at line 82 of file `afile_reader.hpp`.

### 8.1.3.3 `bool uva::utils::file::afile_reader::get_first_line ( text_piece_reader & out )` `[inline]`

Each file reader implementation will need to override these method, if needed. The method is non-virtual for performance reasons!

Definition at line 99 of file `afile_reader.hpp`.

### 8.1.3.4 `bool uva::utils::file::afile_reader::get_first_space ( text_piece_reader & out )` `[inline]`

Each file reader implementation will need to override these method, if needed. The method is non-virtual for performance reasons!

Definition at line 107 of file `afile_reader.hpp`.

### 8.1.3.5 `bool uva::utils::file::afile_reader::get_first_tab ( text_piece_reader & out )` `[inline]`

Each file reader implementation will need to override these method, if needed. The method is non-virtual for performance reasons!

Definition at line 123 of file `afile_reader.hpp`.

### 8.1.3.6 `template<const char delim, const uint8_t delim_len = 1> bool uva::utils::file::afile_reader::get_last ( text_piece_reader & out )` `[inline]`

This function searches backwards for the first occurrence of the argument delimiter symbol.

Definition at line 91 of file `afile_reader.hpp`.

**8.1.3.7** `bool uva::utils::file::afire_reader::get_last_space ( text_piece_reader & out ) [inline]`

Each file reader implementation will need to override these method, if needed. The method is non-virtual for performance reasons!

Definition at line 115 of file `afire_reader.hpp`.

**8.1.3.8** `virtual bool uva::utils::file::afire_reader::is_open ( ) const [pure virtual]`

Allows to check if the file has been open

**Returns**

true if the file is open otherwise false

Implemented in `uva::utils::file::memory_mapped_file_reader`, `uva::utils::file::cstyle_file_reader`, and `uva::utils::file::file_stream_reader`.

**8.1.3.9** `virtual void uva::utils::file::afire_reader::log_reader_type_info ( ) [pure virtual]`

Allows to log the information about the instantiated file reader type

Implemented in `uva::utils::file::memory_mapped_file_reader`, `uva::utils::file::cstyle_file_reader`, and `uva::utils::file::file_stream_reader`.

**8.1.3.10** `virtual uva::utils::file::afire_reader::operator bool ( ) const [pure virtual]`

Allows to convert the file reader to a boolean

**Returns**

true if the file exists, otherwise false

Implemented in `uva::utils::file::memory_mapped_file_reader`, `uva::utils::file::cstyle_file_reader`, and `uva::utils::file::file_stream_reader`.

**8.1.3.11** `virtual void uva::utils::file::afire_reader::reset ( ) [inline],[virtual]`

This method allows to reset the reading process and start reading the file from the first line again. The default implementation throws an exception.

Reimplemented in `uva::utils::file::cstyle_file_reader`, and `uva::utils::file::file_stream_reader`.

Definition at line 73 of file `afire_reader.hpp`.

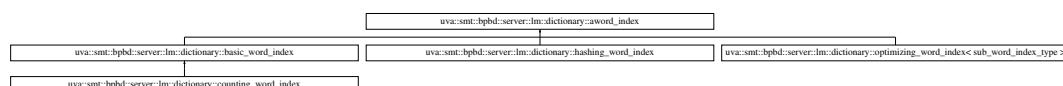
The documentation for this class was generated from the following file:

- `inc/common/utis/file/afire_reader.hpp`

## 8.2 uva::smt::bpbd::server::lm::dictionary::aword\_index Class Reference

```
#include <aword_index.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::dictionary::aword_index`:



## Public Member Functions

- void [reserve](#) (const size\_t num\_words)
- size\_t [get\\_number\\_of\\_words](#) (const size\_t num\_words) const
- word\_uid [get\\_word\\_id](#) (const [text\\_piece\\_reader](#) &token) const
- bool [is\\_word\\_registering\\_needed](#) () const
- word\_uid [register\\_word](#) (const [text\\_piece\\_reader](#) &token)
- bool [is\\_word\\_counts\\_needed](#) () const
- void [count\\_word](#) (const [text\\_piece\\_reader](#) &word, [prob\\_weight](#) prob)
- void [do\\_post\\_word\\_count](#) ()
- bool [is\\_post\\_actions\\_needed](#) () const
- void [do\\_post\\_actions](#) ()
- virtual [~aword\\_index](#) ()

## Static Public Member Functions

- static constexpr bool [is\\_word\\_index\\_continuous](#) ()

### 8.2.1 Detailed Description

This abstract class is used to represent the word dictionary. It contains no specific implementation but is more of an interface. It is used to allow for more word dictionary/index implementations.

Any implementation of this class must issue the unknown word <unk> index 1 (UNKNOWN\_WORD\_ID).

The first real word index will be therefore 2 (MIN\_KNOWN\_WORD\_ID).

The issued word ids must be continuous and non-repeating, unique!

NOTE: All of the methods are non-virtual for the sake of avoiding virtual method call overheads!

Definition at line 60 of file [aword\\_index.hpp](#).

### 8.2.2 Constructor & Destructor Documentation

**8.2.2.1** virtual uva::smt::bpbd::server::lm::dictionary::aword\_index::~aword\_index ( ) [\[inline\]](#), [\[virtual\]](#)

The basic destructor

Definition at line 178 of file [aword\\_index.hpp](#).

### 8.2.3 Member Function Documentation

**8.2.3.1** void uva::smt::bpbd::server::lm::dictionary::aword\_index::count\_word ( const [text\\_piece\\_reader](#) & word, [prob\\_weight](#) prob ) [\[inline\]](#)

This method is to be used when the word counting is needed. The main application here is to first count the number of word usages and then distribute the word ids in such a way that the most used words get the lowest ids.

Parameters

|              |                          |
|--------------|--------------------------|
| <i>token</i> | the word to count        |
| <i>prob</i>  | the word log probability |

Definition at line 128 of file [aword\\_index.hpp](#).



**8.2.3.2** `void uva::smt::bpbd::server::lm::dictionary::aword_index::do_post_actions ( ) [inline]`

Is to be called if the post actions are needed right after that all the individual words have been added into the index.  
Definition at line 154 of file aword\_index.hpp.

**8.2.3.3** `void uva::smt::bpbd::server::lm::dictionary::aword_index::do_post_word_count ( ) [inline]`

Should be called if the word count is needed after all the words have been counted.  
Definition at line 136 of file aword\_index.hpp.

**8.2.3.4** `size_t uva::smt::bpbd::server::lm::dictionary::aword_index::get_number_of_words ( const size_t num_words ) const [inline]`

Allows to get the total words count including the unknown and undefined words

#### Parameters

|                  |                                           |
|------------------|-------------------------------------------|
| <i>num_words</i> | the number of words in the language model |
|------------------|-------------------------------------------|

Definition at line 75 of file aword\_index.hpp.

**8.2.3.5** `word_uid uva::smt::bpbd::server::lm::dictionary::aword_index::get_word_id ( const text_piece_reader & token ) const [inline]`

This function gets an id for the given word based on the stored 1-Grams. Continuous word index: If the word is not known then an unknown word ID is returned: UNKNOWN\_WORD\_ID Discontinuous word index: The returned word id is always  $\geq$  MIN\_KNOWN\_WORD\_ID

#### Parameters

|              |                  |
|--------------|------------------|
| <i>token</i> | the word to hash |
|--------------|------------------|

#### Returns

the word id or UNKNOWN\_WORD\_ID if the word is not found

Definition at line 87 of file aword\_index.hpp.

**8.2.3.6** `bool uva::smt::bpbd::server::lm::dictionary::aword_index::is_post_actions_needed ( ) const [inline]`

Indicates if the post-actions are needed. The post actions should be called after all the words have been filled into the index.

#### Returns

true if the post-actions are needed, otherwise false

Definition at line 146 of file aword\_index.hpp.

**8.2.3.7** `bool uva::smt::bpbd::server::lm::dictionary::aword_index::is_word_counts_needed ( ) const [inline]`

This method allows to indicate whether word counting is needed by the given implementation of the word index.

#### Returns

true if the word counting is needed, otherwise false.

Definition at line 116 of file aword\_index.hpp.

**8.2.3.8** `static constexpr bool uva::smt::bpbd::server::lm::dictionary::aword_index::is_word_index_continuous ( )`  
`[inline], [static]`

Allows to indicate if the word index is continuous, i.e. it issues the word ids in a continuous range starting from 0. Where 0 and 1 are reserved word ids.

If the word index is not continuous then the uni-gram payload can not be stored in a word id indexed array. Moreover, any word id considered to be a known word, i.e. the unknown word id is never returned by the word index.

This method is to be overridden by the children classes. The default implementation returns false!

Definition at line 171 of file `aword_index.hpp`.

**8.2.3.9** `bool uva::smt::bpbd::server::lm::dictionary::aword_index::is_word_registering_needed ( ) const` `[inline]`

This method allows to indicate whether registering a word is needed by the given implementation of the word index.

#### Returns

true if the word registering is needed, otherwise false.

Definition at line 96 of file `aword_index.hpp`.

**8.2.3.10** `word_uid uva::smt::bpbd::server::lm::dictionary::aword_index::register_word ( const text_piece_reader & token )` `[inline]`

This function creates/gets an id for the given word. Note: The ids must be unique and continuous! The returned word id is always  $\geq$  MIN\_KNOWN\_WORD\_ID

#### Parameters

|              |                  |
|--------------|------------------|
| <i>token</i> | the word to hash |
|--------------|------------------|

#### Returns

the resulting hash

Definition at line 107 of file `aword_index.hpp`.

**8.2.3.11** `void uva::smt::bpbd::server::lm::dictionary::aword_index::reserve ( const size_t num_words )` `[inline]`

This method should be used to pre-allocate the word index

#### Parameters

|                  |                     |
|------------------|---------------------|
| <i>num_words</i> | the number of words |
|------------------|---------------------|

Definition at line 67 of file `aword_index.hpp`.

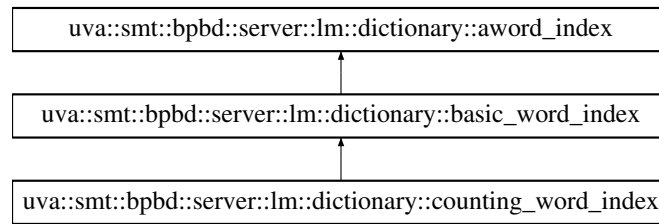
The documentation for this class was generated from the following file:

- [inc/server/lm/dictionaries/aword\\_index.hpp](#)

## 8.3 uva::smt::bpbd::server::lm::dictionary::basic\_word\_index Class Reference

```
#include <basic_word_index.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::dictionary::basic_word_index`:



## Public Types

- typedef pair< const string, [word\\_uid](#) > [TWordIndexEntry](#)
- typedef [greedy\\_memory\\_allocator](#)< [TWordIndexEntry](#) > [TWordIndexAllocator](#)
- typedef unordered\_map< string, [word\\_uid](#), std::hash< string >, std::equal\_to< string >, [TWordIndexAllocator](#) > [TWordIndexMap](#)
- typedef [TWordIndexMap](#)::const\_iterator [TWordIndexMapConstIter](#)

## Public Member Functions

- [basic\\_word\\_index](#) (const float wordIndexMemFactor)
- size\_t [get\\_number\\_of\\_words](#) (const size\_t num\_words) const
- void [reserve](#) (const size\_t num\_words)
- [word\\_uid](#) [get\\_word\\_id](#) (const [text\\_piece\\_reader](#) &token) const
- bool [is\\_word\\_registering\\_needed](#) () const
- [word\\_uid](#) [register\\_word](#) (const [text\\_piece\\_reader](#) &token)
- bool [is\\_word\\_counts\\_needed](#) () const
- void [count\\_word](#) (const [text\\_piece\\_reader](#) &word, [prob\\_weight](#) prob)
- void [do\\_post\\_word\\_count](#) ()
- bool [is\\_post\\_actions\\_needed](#) () const
- void [do\\_post\\_actions](#) ()
- virtual ~[basic\\_word\\_index](#) ()
- [TWordIndexMapConstIter](#) [begin](#) ()
- [TWordIndexMapConstIter](#) [end](#) ()

## Static Public Member Functions

- static constexpr bool [is\\_word\\_index\\_continuous](#) ()

## Protected Member Functions

- [basic\\_word\\_index](#) (const [basic\\_word\\_index](#) &other)

## Protected Attributes

- [TWordIndexAllocator](#) \* [m\\_word\\_index\\_alloc\\_ptr](#)
- [TWordIndexMap](#) \* [m\\_word\\_index\\_map\\_ptr](#)
- [word\\_uid](#) [m\\_next\\_new\\_word\\_id](#)
- const float [m\\_word\\_index\\_mem\\_factor](#)

### 8.3.1 Detailed Description

This is a hash-map based implementation of the word index.

Definition at line 57 of file [basic\\_word\\_index.hpp](#).

### 8.3.2 Member Typedef Documentation

**8.3.2.1** `typedef greedy_memory_allocator< TWordIndexEntry > uva::smt::bpbd::server::lm::dictionary↵  
::basic_word_index::TWordIndexAllocator`

The typedef for the word index allocator

Definition at line 212 of file `basic_word_index.hpp`.

**8.3.2.2** `typedef pair< const string, word_uid> uva::smt::bpbd::server::lm::dictionary::basic_word_index::T↵  
WordIndexEntry`

The type of key,value pairs to be stored in the word index

Definition at line 202 of file `basic_word_index.hpp`.

**8.3.2.3** `typedef unordered_map<string, word_uid, std::hash<string>, std::equal_to<string>, TWordIndexAllocator >↵  
uva::smt::bpbd::server::lm::dictionary::basic_word_index::TWordIndexMap`

The word index map type

Definition at line 217 of file `basic_word_index.hpp`.

**8.3.2.4** `typedef TWordIndexMap::const_iterator uva::smt::bpbd::server::lm::dictionary::basic_word_index::T↵  
WordIndexMapConstIter`

Defines the constant iterator type

Definition at line 222 of file `basic_word_index.hpp`.

### 8.3.3 Constructor & Destructor Documentation

**8.3.3.1** `uva::smt::bpbd::server::lm::dictionary::basic_word_index::basic_word_index ( const float wordIndexMemFactor )↵  
[inline]`

The basic constructor

Parameters

|                                       |                                                                                                             |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <code>wordIndex↵<br/>MemFactor</code> | the assigned memory factor for storage allocation in the <code>unordered_map</code> used for the word index |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------|

Definition at line 65 of file `basic_word_index.hpp`.

**8.3.3.2** `virtual uva::smt::bpbd::server::lm::dictionary::basic_word_index::~~basic_word_index ( ) [inline],↵  
[virtual]`

The basic destructor

Definition at line 200 of file `basic_word_index.hpp`.

**8.3.3.3** `uva::smt::bpbd::server::lm::dictionary::basic_word_index::basic_word_index ( const basic_word_index & other )↵  
[inline], [protected]`

The copy constructor, is made private as we do not intend to copy this class objects

## Parameters

|             |                         |
|-------------|-------------------------|
| <i>orig</i> | the object to copy from |
|-------------|-------------------------|

Definition at line 246 of file basic\_word\_index.hpp.

### 8.3.4 Member Function Documentation

#### 8.3.4.1 TWordIndexMapConstIter uva::smt::bpbd::server::lm::dictionary::basic\_word\_index::begin ( ) [inline]

Allows to get the begin constant iterator

## Returns

the begin constant iterator

Definition at line 228 of file basic\_word\_index.hpp.

#### 8.3.4.2 void uva::smt::bpbd::server::lm::dictionary::basic\_word\_index::count\_word ( const text\_piece\_reader & word, prob\_weight prob ) [inline]

This method is to be used when the word counting is needed.

## See also

AWordIndex

Definition at line 152 of file basic\_word\_index.hpp.

#### 8.3.4.3 void uva::smt::bpbd::server::lm::dictionary::basic\_word\_index::do\_post\_actions ( ) [inline]

Is to be called if the post actions are needed right after that all the individual words have been added into the index.

## See also

AWordIndex

Definition at line 182 of file basic\_word\_index.hpp.

#### 8.3.4.4 void uva::smt::bpbd::server::lm::dictionary::basic\_word\_index::do\_post\_word\_count ( ) [inline]

Should be called if the word count is needed after all the words have been counted.

## See also

AWordIndex

Definition at line 162 of file basic\_word\_index.hpp.

#### 8.3.4.5 TWordIndexMapConstIter uva::smt::bpbd::server::lm::dictionary::basic\_word\_index::end ( ) [inline]

Allows to get the end constant iterator

## Returns

the end constant iterator

Definition at line 236 of file basic\_word\_index.hpp.

**8.3.4.6** `size_t uva::smt::bpbd::server::lm::dictionary::basic_word_index::get_number_of_words ( const size_t num_words ) const [inline]`

Allows to get the total words count including the unknown and undefined words

See also

`AWordIndex`

Definition at line 73 of file `basic_word_index.hpp`.

**8.3.4.7** `word_uid uva::smt::bpbd::server::lm::dictionary::basic_word_index::get_word_id ( const text_piece_reader & token ) const [inline]`

This function gets an id for the given word word based no the stored 1-Grams. If the word is not known then an unknown word ID is returned: `UNKNOWN_WORD_ID`

See also

`AWordIndex`

Definition at line 100 of file `basic_word_index.hpp`.

**8.3.4.8** `bool uva::smt::bpbd::server::lm::dictionary::basic_word_index::is_post_actions_needed ( ) const [inline]`

Indicates if the post-actions are needed. The post actions should be called after all the words have been filled into the index.

See also

`AWordIndex`

Definition at line 173 of file `basic_word_index.hpp`.

**8.3.4.9** `bool uva::smt::bpbd::server::lm::dictionary::basic_word_index::is_word_counts_needed ( ) const [inline]`

This method allows to indicate whether word counting is needed by the given implementation of the word index.

See also

`AWordIndex`

Definition at line 144 of file `basic_word_index.hpp`.

**8.3.4.10** `static constexpr bool uva::smt::bpbd::server::lm::dictionary::basic_word_index::is_word_index_continuous ( ) [inline], [static]`

Allows to indicate if the word index is continuous, i.e. it issues the word ids in a continuous range starting from 0.

See also

`AWordIndex`

Returns

`true` - this word index is continuous.

Definition at line 193 of file `basic_word_index.hpp`.

**8.3.4.11** `bool uva::smt::bpbd::server::lm::dictionary::basic_word_index::is_word_registering_needed ( ) const [inline]`

This method allows to indicate whether registering a word is needed by the given implementation of the word index.

See also

`AWordIndex`

Definition at line 117 of file `basic_word_index.hpp`.

**8.3.4.12** `word_uid uva::smt::bpbd::server::lm::dictionary::basic_word_index::register_word ( const text_piece_reader & token ) [inline]`

This function creates/gets a hash for the given word.

See also

`AWordIndex`

Definition at line 125 of file `basic_word_index.hpp`.

**8.3.4.13** `void uva::smt::bpbd::server::lm::dictionary::basic_word_index::reserve ( const size_t num_words ) [inline]`

This method should be used to pre-allocate the word index

See also

`AWordIndex`

Definition at line 81 of file `basic_word_index.hpp`.

### 8.3.5 Member Data Documentation

**8.3.5.1** `word_uid uva::smt::bpbd::server::lm::dictionary::basic_word_index::m_next_new_word_id [protected]`

Definition at line 258 of file `basic_word_index.hpp`.

**8.3.5.2** `TWordIndexAllocator* uva::smt::bpbd::server::lm::dictionary::basic_word_index::m_word_index_alloc_ptr [protected]`

Definition at line 252 of file `basic_word_index.hpp`.

**8.3.5.3** `TWordIndexMap* uva::smt::bpbd::server::lm::dictionary::basic_word_index::m_word_index_map_ptr [protected]`

Definition at line 255 of file `basic_word_index.hpp`.

**8.3.5.4** `const float uva::smt::bpbd::server::lm::dictionary::basic_word_index::m_word_index_mem_factor [protected]`

Definition at line 262 of file `basic_word_index.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/lm/dictionaries/basic_word_index.hpp`

## 8.4 uva::smt::bpbd::server::lm::caching::BitmapHashCache Class Reference

```
#include <bitmap_hash_cache.hpp>
```

### Public Member Functions

- [BitmapHashCache](#) ()
- virtual [~BitmapHashCache](#) ()
- void [pre\\_allocate](#) (const size\_t num\_elems, const uint8\_t buckets\_factor)
- void [cache\\_m\\_gram\\_hash](#) (const [model\\_m\\_gram](#) gram)
- bool [is\\_hash\\_cached](#) (uint\_fast64\_t key) const

### 8.4.1 Detailed Description

This class is to be used for caching the present of M-grams in the trie. The way it is done is using a bitset. A bitset indicates which hashes are present and therefore which M-grams have a chance to be found in the Trie. This class can give potential speed improvement for the Tries which are context/layer based and use search algorithms to go through levels.

Definition at line 61 of file `bitmap_hash_cache.hpp`.

### 8.4.2 Constructor & Destructor Documentation

**8.4.2.1** `uva::smt::bpbd::server::lm::caching::BitmapHashCache::BitmapHashCache ( )` `[inline]`

The basic constructor, does not do much - only default initialization

Definition at line 67 of file `bitmap_hash_cache.hpp`.

**8.4.2.2** `virtual uva::smt::bpbd::server::lm::caching::BitmapHashCache::~~BitmapHashCache ( )` `[inline]`,  
`[virtual]`

The basic destructor

Definition at line 73 of file `bitmap_hash_cache.hpp`.

### 8.4.3 Member Function Documentation

**8.4.3.1** `void uva::smt::bpbd::server::lm::caching::BitmapHashCache::cache_m_gram_hash ( const model\_m\_gram gram )`  
`[inline]`

Allows to add the M-gram to the cache

Parameters

|             |                     |
|-------------|---------------------|
| <i>gram</i> | the M-gram to cache |
|-------------|---------------------|

Definition at line 110 of file `bitmap_hash_cache.hpp`.

**8.4.3.2** `bool uva::smt::bpbd::server::lm::caching::BitmapHashCache::is_hash_cached ( uint_fast64_t key )` const  
`[inline]`

Allows to check if the given sub-m-gram, defined by the `begin_word_idx` and `end_word_idx` parameters, is potentially present in the trie.



#### Parameters

|            |                |
|------------|----------------|
| <i>key</i> | the m-gram key |
|------------|----------------|

#### Returns

true if the sub-m-gram is potentially present, otherwise false

Definition at line 131 of file `bitmap_hash_cache.hpp`.

**8.4.3.3** `void uva::smt::bpbd::server::lm::caching::BitmapHashCache::pre_allocate ( const size_t num_elems, const uint8_t buckets_factor ) [inline]`

Allowo to pre-allocate memory for the bitset

#### Parameters

|                  |  |
|------------------|--|
| <i>num_elems</i> |  |
|------------------|--|

#### Returns

Definition at line 84 of file `bitmap_hash_cache.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/lm/models/bitmap_hash_cache.hpp`

## 8.5 `uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >` Class Template Reference

```
#include <m_gram_id.hpp>
```

### Static Public Member Functions

- static uint8\_t `create_m_gram_id` (const TWordIdType \*word\_ids, const uint8\_t num\_word\_ids, TM\_Gram\_Id\_Value\_Ptr &m\_p\_gram\_id)
- static uint8\_t `compute_m_gram_id` (const TWordIdType \*word\_ids, const uint8\_t num\_word\_ids, TM\_Gram\_Id\_Value\_Ptr m\_p\_gram\_id)
- static void `allocate_byte_m_gram_id` (const phrase\_length level, TM\_Gram\_Id\_Value\_Ptr &m\_p\_gram\_id)
- static int `compare` (const uint8\_t id\_len\_bytes, const TM\_Gram\_Id\_Value\_Ptr &m\_p\_gram\_id\_one, const TM\_Gram\_Id\_Value\_Ptr &m\_p\_gram\_id\_two)
- static bool `is_equal_m_grams_id` (const uint8\_t id\_len\_bytes, const TM\_Gram\_Id\_Value\_Ptr &one, const TM\_Gram\_Id\_Value\_Ptr &two)
- static bool `is_less_m_grams_id` (const uint8\_t id\_len\_bytes, const TM\_Gram\_Id\_Value\_Ptr &one, const TM\_Gram\_Id\_Value\_Ptr &two)
- template<phrase\_length CURR\_LEVEL>  
static const uint8\_t & `gram_id_type_2_byte_len` (uint32\_t id\_type)
- static const uint32\_t & `gram_id_byte_len_2_type` (const phrase\_length gram\_level, uint8\_t \*len\_bytes)
- template<phrase\_length CURR\_LEVEL>  
static bool `is_less_m_grams_id` (const uint8\_t id\_type\_len\_bytes, const TM\_Gram\_Id\_Value\_Ptr &one, const TM\_Gram\_Id\_Value\_Ptr &two)
- static bool `is_more_m_grams_id` (const uint8\_t id\_len\_bytes, const TM\_Gram\_Id\_Value\_Ptr &one, const TM\_Gram\_Id\_Value\_Ptr &two)

## Static Public Attributes

- static constexpr uint8\_t [NUM\\_BYTES\\_WORD\\_ID](#) = sizeof (TWordIdType)
- static constexpr uint32\_t [NUMBER\\_ID\\_TYPES\\_PER\\_LEVEL](#) []
- static constexpr uint8\_t [ID\\_TYPE\\_LEN\\_BYTES](#) []
- static constexpr uint8\_t [MAX\\_ID\\_LEN\\_BYTES](#) []
- static constexpr uint32\_t [LEVEL\\_2\\_GRAM\\_TO\\_TYPE\\_LEN](#) [[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)]
- static constexpr uint32\_t [LEVEL\\_3\\_GRAM\\_TO\\_TYPE\\_LEN](#) [[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)]
- static constexpr uint32\_t [LEVEL\\_4\\_GRAM\\_TO\\_TYPE\\_LEN](#) [[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)]
- static constexpr uint32\_t [LEVEL\\_5\\_GRAM\\_TO\\_TYPE\\_LEN](#) [[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)]
- static constexpr uint32\_t [LEVEL\\_6\\_GRAM\\_TO\\_TYPE\\_LEN](#) [[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)][[NUM\\_BYTES\\_WORD\\_ID](#)]
- static constexpr uint8\_t [LEVEL\\_2\\_GRAM\\_TO\\_BYTE\\_LEN](#) [] = {2, 3, 4, 5, 3, 4, 5, 6, 4, 5, 6, 7, 5, 6, 7, 8}
- static constexpr uint8\_t [LEVEL\\_3\\_GRAM\\_TO\\_BYTE\\_LEN](#) [] = {3, 4, 5, 6, 4, 5, 6, 7, 5, 6, 7, 8, 6, 7, 8, 9, 4, 5, 6, 7, 5, 6, 7, 8, 6, 7, 8, 9, 10, 5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12}
- static constexpr uint8\_t [LEVEL\\_4\\_GRAM\\_TO\\_BYTE\\_LEN](#) [] = {4, 5, 6, 7, 5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16}
- static constexpr uint8\_t [LEVEL\\_5\\_GRAM\\_TO\\_BYTE\\_LEN](#) [] = {5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 17, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 17, 18, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 17, 18, 19, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000}

**static constexpr uint8\_t LEVEL\_6\_GRAM\_TO\_BYTE\_LEN [] = {**

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 6,  | 7,  | 8,  | 9,  | 7,  | 8,  | 9,  | 10, | 8,  | 9,  | 10, | 11, | 9,  | 10, | 11, |
| 12, | 7,  | 8,  | 9,  | 10, | 8,  | 9,  | 10, | 11, | 9,  | 10, | 11, | 12, | 10, | 11, |
| 12, | 13, | 8,  | 9,  | 10, | 11, | 9,  | 10, | 11, | 12, | 10, | 11, | 12, | 13, | 11, |
| 12, | 13, | 11, | 12, | 13, | 14, | 12, | 13, | 14, | 15, | 7,  | 8,  | 9,  | 10, | 8,  |
| 9,  | 10, | 11, | 9,  | 10, | 11, | 12, | 10, | 11, | 12, | 13, | 11, | 12, | 13, | 14, |
| 12, | 13, | 8,  | 9,  | 10, | 11, | 9,  | 10, | 11, | 12, | 10, | 11, | 12, | 13, | 11, |
| 12, | 13, | 11, | 12, | 13, | 14, | 9,  | 10, | 11, | 12, | 10, | 11, | 12, | 13, | 11, |
| 12, | 13, | 14, | 15, | 10, | 11, | 12, | 13, | 11, | 12, | 13, | 14, | 12, | 13, | 14, |
| 15, | 13, | 14, | 15, | 16, | 8,  | 9,  | 10, | 11, | 9,  | 10, | 11, | 12, | 10, | 11, |
| 11, | 12, | 13, | 11, | 12, | 13, | 14, | 9,  | 10, | 11, | 12, | 10, | 11, | 12, | 13, |
| 11, | 12, | 13, | 14, | 15, | 10, | 11, | 12, | 13, | 11, | 12, | 13, | 14, | 12, | 13, |
| 14, | 12, | 13, | 14, | 15, | 13, | 14, | 15, | 16, | 11, | 12, | 13, | 14, | 12, | 13, |
| 14, | 15, | 13, | 14, | 15, | 16, | 14, | 15, | 16, | 17, | 9,  | 10, | 11, | 12, | 10, |
| 11, | 12, | 13, | 11, | 12, | 13, | 14, | 12, | 13, | 14, | 15, | 10, | 11, | 12, | 13, |
| 14, | 12, | 13, | 14, | 15, | 13, | 14, | 15, | 16, | 14, | 15, | 16, | 17, | 12, | 13, |
| 14, | 15, | 13, | 14, | 15, | 16, | 14, | 15, | 16, | 17, | 12, | 13, | 14, | 15, | 13, |
| 14, | 15, | 16, | 14, | 15, | 16, | 17, | 12, | 13, | 14, | 15, | 13, | 14, | 15, | 16, |
| 17, | 15, | 16, | 17, | 18, | 6,  | 7,  | 8,  | 9,  | 7,  | 8,  | 9,  | 10, | 8,  | 9,  |
| 10, | 11, | 9,  | 10, | 11, | 12, | 7,  | 8,  | 9,  | 10, | 8,  | 9,  | 10, | 11, | 9,  |
| 10, | 11, | 12, | 10, | 11, | 12, | 13, | 11, | 12, | 13, | 14, | 9,  | 10, | 11, | 12, |
| 10, | 11, | 12, | 13, | 8,  | 9,  | 10, | 11, | 9,  | 10, | 11, | 12, | 10, | 11, | 12, |
| 13, | 11, | 12, | 13, | 14, | 9,  | 10, | 11, | 12, | 10, | 11, | 12, | 13, | 11, | 12, |
| 13, | 14, | 12, | 13, | 14, | 15, | 7,  | 8,  | 9,  | 10, | 8,  | 9,  | 10, | 11, | 9,  |
| 10, | 11, | 12, | 10, | 11, | 12, | 13, | 8,  | 9,  | 10, | 11, | 9,  | 10, | 11, | 12, |
| 10, | 11, | 12, | 13, | 11, | 12, | 13, | 14, | 9,  | 10, | 11, | 12, | 13, | 14, | 15, |
| 10, | 11, | 12, | 13, | 14, | 15, | 10, | 11, | 12, | 13, | 11, | 12, | 13, | 14, | 12, |
| 13, | 14, | 12, | 13, | 14, | 15, | 13, | 14, | 15, | 16, | 8,  | 9,  | 10, | 11, | 9,  |
| 10, | 11, | 12, | 10, | 11, | 12, | 13, | 11, | 12, | 13, | 14, | 9,  | 10, | 11, | 12, |
| 10, | 11, | 12, | 13, | 14, | 12, | 13, | 14, | 15, | 10, | 11, | 12, | 13, | 11, | 12, |
| 13, | 14, | 12, | 13, | 14, | 15, | 13, | 14, | 15, | 16, | 11, | 12, | 13, | 14, | 12, |
| 13, | 14, | 15, | 10, | 11, | 12, | 13, | 11, | 12, | 13, | 14, | 12, | 13, | 14, | 15, |
| 13, | 14, | 15, | 16, | 14, | 15, | 16, | 17, | 12, | 13, | 14, | 15, | 13, | 14, | 15, |
| 16, | 14, | 15, | 16, | 17, | 12, | 13, | 14, | 15, | 13, | 14, | 15, | 16, | 14, | 15, |
| 16, | 17, | 15, | 16, | 17, | 18, | 6,  | 7,  | 8,  | 9,  | 7,  | 8,  | 9,  | 10, | 8,  |
| 9,  | 10, | 11, | 9,  | 10, | 11, | 12, | 7,  | 8,  | 9,  | 10, | 8,  | 9,  | 10, | 11, |
| 9,  | 10, | 11, | 12, | 7,  | 8,  | 9,  | 10, | 8,  | 9,  | 10, | 11, | 9,  | 10, | 11, |
| 12, | 10, | 11, | 12, | 13, | 8,  | 9,  | 10, | 11, | 9,  | 10, | 11, | 12, | 10, | 11, |
| 11, | 12, | 13, | 11, | 12, | 13, | 14, | 9,  | 10, | 11, | 12, | 10, | 11, | 12, | 13, |
| 11, | 12, | 1   |     |     |     |     |     |     |     |     |     |     |     |     |



```

15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 11, 12, 13,
14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18,
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13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14,
15, 16, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16,
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19, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 17, 18, 19, 20, 15, 16, 17, 18, 16, 17, 18, 19, 17, 18, 19, 20,
18, 19, 20, 21, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12,
13, 14, 15, 13, 14, 15, 16, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 12, 13, 14, 15, 13, 14,
15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 11, 12, 13,
14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18,
13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14,
15, 16, 17, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16,
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16, 14, 15, 16, 17, 15, 16, 17, 18, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 14, 15, 16, 17,
15, 16, 17, 18, 16, 17, 18, 19, 17, 18, 19, 20, 15, 16, 17, 18, 16, 17, 18, 19, 17, 18, 19, 20, 18, 19, 20, 21, 9,
10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14,
15, 16, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16,
17, 15, 16, 17, 18, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 11, 12, 13, 14, 12, 13, 14, 15,
13, 14, 15, 16, 14, 15, 16, 17, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 13, 14, 15, 16, 14,
15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 12, 13,
14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18,
19, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 17, 18, 19, 20, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17,
15, 16, 17, 18, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 14, 15, 16, 17, 15, 16, 17, 18, 16,
17, 18, 19, 17, 18, 19, 20, 15, 16, 17, 18, 16, 17, 18, 19, 17, 18, 19, 20, 18, 19, 20, 21}

```

## 8.5.1 Detailed Description

```
template<typename TWorldIdType>class uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWorldIdType >
```

The byte-compressed implementation of the M-gram id class

Definition at line 97 of file m\_gram\_id.hpp.

## 8.5.2 Member Function Documentation

```

8.5.2.1 template<typename TWorldIdType > static void uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWorldIdType >::allocate_byte_m_gram_id (const phrase_length level,
TM_Gram_Id_Value_Ptr & m_p_gram_id) [inline], [static]

```

The basic constructor that allocates maximum memory needed to store the M-gram id of the given level.

Parameters

|                    |                                                         |
|--------------------|---------------------------------------------------------|
| <i>level</i>       | the level of the M-grams this object will store id for. |
| <i>m_p_gram_id</i> | the pointer to initialize                               |

Definition at line 192 of file m\_gram\_id.hpp.

```
8.5.2.2 template<typename TWorldIdType > static int uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_↵
 M_Gram_Id< TWorldIdType >::compare (const uint8_t id_len_bytes, const TM_Gram_Id_Value_Ptr &
 m_p_gram_id_one, const TM_Gram_Id_Value_Ptr & m_p_gram_id_two) [inline],[static]
```

Allows to compare two M-Gram ids of a fixed M-gram level

## Parameters

|                                                |                                                       |
|------------------------------------------------|-------------------------------------------------------|
| <i>id_len_bytes</i>                            | the minimum total number of bytes in both m-gram ids. |
| <i>m_p_gram_id</i> <sub>↔</sub><br><i>_one</i> | the first M-gram id                                   |
| <i>m_p_gram_id</i> <sub>↔</sub><br><i>_two</i> | the second M-gram id                                  |

## Returns

Negative value if one is smaller than two Zero if one is equal to two Positive value if one is larger than two

Definition at line 213 of file m\_gram\_id.hpp.

8.5.2.3 `template<typename TWordIdType > uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::compute_m_gram_id ( const TWordIdType * word_ids, const uint8_t num_word_ids, TM_Gram_Id_Value_Ptr m_p_gram_id ) [static]`

This method allows to compute the m-gram id and set it into the pre-allocated memory given by a pointer.

## Parameters

|                     |                                                   |
|---------------------|---------------------------------------------------|
| <i>word_ids</i>     | the pointer to the array of word ids              |
| <i>num_word_ids</i> | the number of word ids                            |
| <i>m_p_gram_id</i>  | the pointer to the data storage to be initialized |

## Returns

the number of bytes in the m-gram id

This method is needed to compute the M-gram id.

Let us give an example of a 2-gram id for a given 2-gram:

1) The 2 word\_ids are to be converted to the 2-gram id: There are 4 bytes in one word id and 4 bytes in another word id, In total we have 4<sup>2</sup> possible 2-gram id lengths in bytes, if we only use meaningful bytes of the word id for instance: 01-01 both really need just two bytes 01-02 the first needs one and another two 02-01 the first needs two and another one ... 04-04 both need 8 bytes

2) These 4<sup>2</sup> = 16 combinations uniquely identify the type of stored id. So this can be an uid of the gram id type. To store such a uid we need ceil(log2(16)/8)= 1 bits.

3) We create the 2-gram id as a byte array of 1+ bytes: the type

- the meaningful byte from wordId2 and wordId1. We start from the end (reverse the word order) as this can potentially increase speed of the comparison operation.

Definition at line 252 of file byte\_m\_gram\_id.cpp.

8.5.2.4 `template<typename TWordIdType > uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::create_m_gram_id ( const TWordIdType * word_ids, const uint8_t num_word_ids, TM_Gram_Id_Value_Ptr & m_p_gram_id ) [static]`

This method allows to create new M-gram id for the given M-gram. There should be no memory allocated for the M-gram id. This method will allocate as much as needed to store the given id.

## Parameters

|                     |                                                   |
|---------------------|---------------------------------------------------|
| <i>word_ids</i>     | the pointer to the array of word ids              |
| <i>num_word_ids</i> | the number of word ids                            |
| <i>m_p_gram_id</i>  | the pointer to the data storage to be initialized |

## Returns

the number of bytes in the m-gram id

This method is needed to compute the M-gram id.

Let us give an example of a 2-gram id for a given 2-gram:

1) The 2 *word\_ids* are to be converted to the 2-gram id: There are 4 bytes in one word id and 4 bytes in another word id, In total we have  $4^2$  possible 2-gram id lengths in bytes, if we only use meaningful bytes of the word id for instance: 01-01 both really need just two bytes 01-02 the first needs one and another two 02-01 the first needs two and another one ... 04-04 both need 8 bytes

2) These  $4^2 = 16$  combinations uniquely identify the type of stored id. So this can be an uid of the gram id type. To store such a uid we need  $\text{ceil}(\log_2(16)/8) = 1$  bits.

3) We create the 2-gram id as a byte array of 1+ bytes: the type

- the meaningful byte from *wordId2* and *wordId1*. We start from the end (reverse the word order) as this can potentially increase speed of the comparison operation.

Definition at line 173 of file *byte\_m\_gram\_id.cpp*.

```
8.5.2.5 template<typename TWordIdType > static const uint32_t& uva::smt::bpbdd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::gram_id_byte_len_2_type (const phrase_length gram_level, uint8_t * len_bytes) [inline],[static]
```

This method is needed to compute the id type identifier. Can compute the id type for the M-grams until (and including)  $M = 6$

## Parameters

|                   |                                                             |
|-------------------|-------------------------------------------------------------|
| <i>gram_level</i> | the number of word ids                                      |
| <i>len_bytes</i>  | the bytes needed per word id                                |
| <i>return</i>     | the resulting id type the initial value is expected to be 0 |

Definition at line 288 of file *m\_gram\_id.hpp*.

```
8.5.2.6 template<typename TWordIdType > template<phrase_length CURR_LEVEL> static const uint8_t& uva::smt::bpbdd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::gram_id_type_2_byte_len (uint32_t id_type) [inline],[static]
```

Allows to compute the byte length for the id of the given type. Can compute the byte length for the M-grams until (and including)  $M = 6$ .

## Parameters

|                   |                    |
|-------------------|--------------------|
| <i>CURR_LEVEL</i> | the M-Gram level M |
| <i>id_type</i>    | the type id        |

## Returns

the total byte length to store the id of this type.

Definition at line 259 of file *m\_gram\_id.hpp*.



8.5.2.7 `template<typename TWorldIdType > static bool uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWorldIdType >::is_equal_m_grams_id ( const uint8_t id_len_bytes, const TM_Gram_Id_Value_Ptr & one, const TM_Gram_Id_Value_Ptr & two ) [inline], [static]`

This is a fore-declaration of the function that can compare two M-gram ids of the same given level

## Parameters

|                     |                                                       |
|---------------------|-------------------------------------------------------|
| <i>id_len_bytes</i> | the minimum total number of bytes in both m-gram ids. |
| <i>one</i>          | the first M-gram to compare                           |
| <i>two</i>          | the second M-gram to compare                          |

## Returns

true if the first M-gram is "smaller" than the second, otherwise false

Definition at line 234 of file m\_gram\_id.hpp.

```
8.5.2.8 template<typename TWordIdType > static bool uva::smt::bpbd::server::lm::m_grams::m_gram↵
_id::Byte_M_Gram_Id< TWordIdType >::is_less_m_grams_id (const uint8_t id_len_bytes, const
TM_Gram_Id_Value_Ptr & one, const TM_Gram_Id_Value_Ptr & two) [inline],[static]
```

This is a fore-declaration of the function that can compare two M-gram ids of the same given level

## Parameters

|                     |                                                       |
|---------------------|-------------------------------------------------------|
| <i>id_len_bytes</i> | the minimum total number of bytes in both m-gram ids. |
| <i>one</i>          | the first M-gram to compare                           |
| <i>two</i>          | the second M-gram to compare                          |

## Returns

true if the first M-gram is "smaller" than the second, otherwise false

Definition at line 246 of file m\_gram\_id.hpp.

```
8.5.2.9 template<typename TWordIdType > template<phrase_length CURR_LEVEL> static bool
uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType
>::is_less_m_grams_id (const uint8_t id_type_len_bytes, const TM_Gram_Id_Value_Ptr & one, const
TM_Gram_Id_Value_Ptr & two) [inline],[static]
```

This is a fore-declaration of the function that can compare two M-gram ids of the same given level

## Parameters

|                               |                                                       |
|-------------------------------|-------------------------------------------------------|
| <i>id_type_len↵<br/>bytes</i> | the minimum total number of bytes in both m-gram ids. |
| <i>one</i>                    | the first M-gram to compare                           |
| <i>two</i>                    | the second M-gram to compare                          |

## Returns

true if the first M-gram is "smaller" than the second, otherwise false

Definition at line 318 of file m\_gram\_id.hpp.

```
8.5.2.10 template<typename TWordIdType > static bool uva::smt::bpbd::server::lm::m_grams::m_gram↵
_id::Byte_M_Gram_Id< TWordIdType >::is_more_m_grams_id (const uint8_t id_len_bytes, const
TM_Gram_Id_Value_Ptr & one, const TM_Gram_Id_Value_Ptr & two) [inline],[static]
```

This is a fore-declaration of the function that can compare two M-gram ids of the same given level

## Parameters

|                     |                                                       |
|---------------------|-------------------------------------------------------|
| <i>id_len_bytes</i> | the minimum total number of bytes in both m-gram ids. |
| <i>one</i>          | the first M-gram to compare                           |
| <i>two</i>          | the second M-gram to compare                          |

## Returns

true if the first M-gram is "larger" than the second, otherwise false

Definition at line 347 of file m\_gram\_id.hpp.

## 8.5.3 Member Data Documentation

**8.5.3.1** `template<typename TWordIdType > constexpr uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::ID_TYPE_LEN_BYTES`  
`[static]`

### Initial value:

```
= {
 0,
 N_GRAM_ID_TYPE_LEN_BYTES(1),
 N_GRAM_ID_TYPE_LEN_BYTES(2),
 N_GRAM_ID_TYPE_LEN_BYTES(3),
 N_GRAM_ID_TYPE_LEN_BYTES(4),
 N_GRAM_ID_TYPE_LEN_BYTES(5),
 N_GRAM_ID_TYPE_LEN_BYTES(6),
}
```

Definition at line 125 of file m\_gram\_id.hpp.

**8.5.3.2** `template<typename TWordIdType > constexpr uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::LEVEL_2_GRAM_TO_BYTE_LEN = {2, 3, 4, 5, 3, 4, 5, 6, 4, 5, 6, 7, 5, 6, 7, 8}`  
`[static]`

Definition at line 2362 of file m\_gram\_id.hpp.

**8.5.3.3** `template<typename TWordIdType > constexpr uint32_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::LEVEL_2_GRAM_TO_TYPE_LEN`  
`[static]`

### Initial value:

```
= {
 { 0, 4, 8, 12},
 { 1, 5, 9, 13},
 { 2, 6, 10, 14},
 { 3, 7, 11, 15}
}
```

This method is needed to compute the id type identifier. Can compute the id type for M-grams until (including) M = 5  
The type is computed as in a 32-based numeric system, e.g. for M==5: (len\_bits[0]-1)\*32^0 + (len\_bits[1]-1)\*32^1 + (len\_bits[2]-1)\*32^2 + (len\_bits[3]-1)\*32^3 + (len\_bits[4]-1)\*32^4

## Parameters

|                   |                                                                   |
|-------------------|-------------------------------------------------------------------|
| <i>gram_level</i> | the number of word ids                                            |
| <i>len_bytes</i>  | the bytes needed per word id                                      |
| <i>id_type</i>    | [out] the resulting id type the initial value is expected to be 0 |

```
static inline void gram_id_byte_len_2_type(const phrase_length gram_level, uint8_t * len_bytes, uint32_t & id_type) { Do the sanity check for against overflows ASSERT_SANITY_THROW((gram_level > M_GRAM_LEVEL_5), string("Unsupported m-gram level: ") + std::to_string(gram_level) + string(", must be within [") + std::to_string(M_GRAM_LEVEL_2) + string(", ") + std::to_string(M_GRAM_LEVEL_6) + string("], insufficient multipliers!"));
```

```
LOG_DEBUG3 << "Computing the " << SSTR(gram_level) << "-gram id type" << END_LOG;
```

```
Compute the M-gram id type. Here we use the pre-computed multipliers for (size_t idx = 0; idx < gram_level; ++idx) { LOG_DEBUG3 << ((uint32_t) len_bytes[idx] - 1) << " * " << NUMBER_ID_TYPES_PER_LEVEL[idx] << " = " << ((uint32_t) len_bytes[idx] - 1) * NUMBER_ID_TYPES_PER_LEVEL[idx] << END_LOG;
```

```
id_type += ((uint32_t) len_bytes[idx] - 1) * NUMBER_ID_TYPES_PER_LEVEL[idx]; } LOG_DEBUG3 << "Resulting id_type = " << SSTR(id_type) << END_LOG; };
```

Definition at line 61 of file m\_gram\_id.hpp.

```
8.5.3.4 template<typename TWordIdType > constexpr uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::LEVEL_3_GRAM_TO_BYTE_LEN = {3, 4, 5, 6, 4, 5, 6, 7, 5, 6, 7, 8, 6, 7, 8, 9, 4, 5, 6, 7, 5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12} [static]
```

Definition at line 2363 of file m\_gram\_id.hpp.

```
8.5.3.5 template<typename TWordIdType > constexpr uint32_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::LEVEL_3_GRAM_TO_TYPE_LEN [static]
```

## Initial value:

```
= {
 {
 { 0, 16, 32, 48},
 { 4, 20, 36, 52},
 { 8, 24, 40, 56},
 { 12, 28, 44, 60}
 },
 {
 { 1, 17, 33, 49},
 { 5, 21, 37, 53},
 { 9, 25, 41, 57},
 { 13, 29, 45, 61}
 },
 {
 { 2, 18, 34, 50},
 { 6, 22, 38, 54},
 { 10, 26, 42, 58},
 { 14, 30, 46, 62}
 },
 {
 { 3, 19, 35, 51},
 { 7, 23, 39, 55},
 { 11, 27, 43, 59},
 { 15, 31, 47, 63}
 }
}
```

Definition at line 67 of file m\_gram\_id.hpp.

8.5.3.6 `template<typename TWordIdType > constexpr uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::LEVEL_4_GRAM_TO_BYTE_LEN = {4, 5, 6, 7, 5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16}` [static]

Definition at line 2364 of file m\_gram\_id.hpp.

8.5.3.7 `template<typename TWordIdType > constexpr uint32_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::LEVEL_4_GRAM_TO_TYPE_LEN` [static]

Definition at line 93 of file m\_gram\_id.hpp.

8.5.3.8 `template<typename TWordIdType > constexpr uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWordIdType >::LEVEL_5_GRAM_TO_BYTE_LEN = {5, 6, 7, 8, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 6, 7, 8, 9, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 7, 8, 9, 10, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 8, 9, 10, 11, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 9, 10, 11, 12, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 10, 11, 12, 13, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 11, 12, 13, 14, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 12, 13, 14, 15, 13, 14, 15, 16, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 13, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 14, 15, 16, 17, 15, 16, 17, 18, 16, 17, 18, 19, 17, 18, 19, 20}` [static]

Definition at line 2365 of file m\_gram\_id.hpp.

```
8.5.3.9 template<typename TWorldType > constexpr uint32_t uva::smt::bpbdd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWorldType >::LEVEL_5_GRAM_TO_TYPE_LEN
[static]
```

Definition at line 199 of file m\_gram\_id.hpp.

Generated on Mon Mar 14 2016 12:49:06 for Basic Phrase Based Decoding by Doxygen

```
8.5.3.11 template<typename TWorldType > constexpr uint32_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWorldType >::LEVEL_6_GRAM_TO_TYPE_LEN
[static]
```

Definition at line 625 of file m\_gram\_id.hpp.

```
8.5.3.12 template<typename TWorldType > constexpr uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWorldType >::MAX_ID_LEN_BYTES
[static]
```

**Initial value:**

```
= {
 0,
 MAX_N_GRAM_ID_LEN_BYTES (1),
 MAX_N_GRAM_ID_LEN_BYTES (2),
 MAX_N_GRAM_ID_LEN_BYTES (3),
 MAX_N_GRAM_ID_LEN_BYTES (4),
 MAX_N_GRAM_ID_LEN_BYTES (5),
 MAX_N_GRAM_ID_LEN_BYTES (6),
}
```

Definition at line 146 of file m\_gram\_id.hpp.

```
8.5.3.13 template<typename TWorldType > constexpr uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWorldType >::NUM_BYTES_WORD_ID = sizeof (TWorldType)
[static]
```

Definition at line 101 of file m\_gram\_id.hpp.

```
8.5.3.14 template<typename TWorldType > constexpr uint32_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::Byte_M_Gram_Id< TWorldType >::NUMBER_ID_TYPES_PER_LEVEL
[static]
```

**Initial value:**

```
= {
 NUM_BYTES_WORD_ID, 0), const_expr::power (
 NUM_BYTES_WORD_ID, 1), const_expr::power (
 NUM_BYTES_WORD_ID, 2), const_expr::power (
 NUM_BYTES_WORD_ID, 3), const_expr::power (
 NUM_BYTES_WORD_ID, 4), const_expr::power (
 NUM_BYTES_WORD_ID, 5), const_expr::power (
 NUM_BYTES_WORD_ID, 6), const_expr::power (
 NUM_BYTES_WORD_ID, 7) const_expr::power (
}
```

Stores the m-gram id multipliers up to and including level 7

Definition at line 106 of file m\_gram\_id.hpp.

The documentation for this class was generated from the following files:

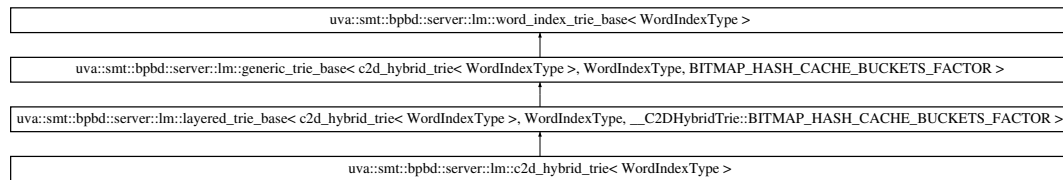
- [inc/server/lm/mgrams/m\\_gram\\_id.hpp](#)
- [src/server/lm/mgrams/byte\\_m\\_gram\\_id.cpp](#)



## 8.6 uva::smt::bpbd::server::lm::c2d\_hybrid\_trie< WordIndexType > Class Template Reference

```
#include <c2d_hybrid_trie.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::lm::c2d\_hybrid\_trie< WordIndexType >:



### Public Types

- typedef `layered_trie_base< c2d_hybrid_trie< WordIndexType >, WordIndexType, __C2DHybridTrie::BITMAP_HASH_CACHE_BUCKETS_FACTOR > BASE`

### Public Member Functions

- `c2d_hybrid_trie(WordIndexType &word_index, const float mram_mem_factor=__C2DHybridTrie::UM_M_GRAM_MEMORY_FACTOR, const float ngram_mem_factor=__C2DHybridTrie::UM_N_GRAM_MEMORY_FACTOR)`
- `float get_unk_word_prob() const`
- `bool get_ctx_id(const phrase_length level_idx, const TShortId word_id, TLongId &ctx_id) const`
- `void log_model_type_info() const`
- `virtual void pre_allocate(const size_t counts[LM_M_GRAM_LEVEL_MAX])`
- `template<phrase_length CURR_LEVEL> void add_m_gram(const model_m_gram &gram)`
- `void get_unigram_payload(m_gram_query &query) const`
- `void get_m_gram_payload(m_gram_query &query, MGramStatusEnum &status) const`
- `void get_n_gram_payload(m_gram_query &query, MGramStatusEnum &status) const`
- `void set_def_unk_word_prob(const prob_weight prob)`
- `virtual ~c2d_hybrid_trie()`

### Additional Inherited Members

#### 8.6.1 Detailed Description

```
template<typename WordIndexType>class uva::smt::bpbd::server::lm::c2d_hybrid_trie< WordIndexType >
```

This is a hybrid trie implementation inspired by the four other ones:

W2COrderedArrayTrie, C2WOrderedArrayTrie, CtxMultiHashMapTrie, and W2CHybridMemoryTrie

It tries to be as much memory efficient as speed efficient. More specifically we store as much data as possible in an array form in order to get optimal memory consumption and having short and easily definable context index. Yet, we use unordered maps for the sake of speeding up queries, as they allow us to realize (word\_id, ctx\_id) to ctx\_id in the most efficient manner. The lookup should be just O(1) whereas in the lookup is O(log(n)), as we need to use binary searches there.

Definition at line 68 of file c2d\_hybrid\_trie.hpp.

## 8.6.2 Member Typedef Documentation

8.6.2.1 `template<typename WordIndexType > typedef layered_trie_base<c2d_hybrid_trie<WordIndexType>, WordIndexType, __C2DHybridTrie::BITMAP_HASH_CACHE_BUCKETS_FACTOR> uva::smt::bpbdd::server::lm::c2d_hybrid_trie< WordIndexType >::BASE`

Definition at line 70 of file c2d\_hybrid\_trie.hpp.

## 8.6.3 Constructor & Destructor Documentation

8.6.3.1 `template<typename WordIndexType > uva::smt::bpbdd::server::lm::c2d_hybrid_trie< WordIndexType >::c2d_hybrid_trie ( WordIndexType & word_index, const float mram_mem_factor = __C2DHybridTrie::UM_M_GRAM_MEMORY_FACTOR, const float ngram_mem_factor = __C2DHybridTrie::UM_N_GRAM_MEMORY_FACTOR ) [explicit]`

The basic class constructor, accepts memory factors that are the coefficients used when pre-allocating memory for unordered maps.

If a factor is equal to 0.0 then no memory is pre-allocated. If the factor is equal to 1.0 then there is only as much preallocated as needed to store the gram entries. The latter is typically not enough as unordered\_map needs more memory for internal administration. If there is not enough memory pre-allocated then additional allocations will take place but it does not always lead to more efficient memory usage. The observed behavior is that it is better to pre-allocate a bit more memory beforehand, than needed. This leads to less memory consumption. Depending on the type of unordered\_map key/value pair types the advised factor values are from 2.0 to 2.6. Because it can not be optimally determined beforehand, these are made constructor parameters so that they can be configured by the user. This breaks encapsulation a bit, exposing the internals, but there is no other better way, for fine tuning the memory usage.

Parameters

|                              |                                                                                  |
|------------------------------|----------------------------------------------------------------------------------|
| <code>_pWordIndex</code>     | the word index to be used                                                        |
| <code>_oGramMemFactor</code> | The One-Gram memory factor needed for the greedy allocator for the unordered_map |
| <code>_mGramMemFactor</code> | The M-Gram memory factor needed for the greedy allocator for the unordered_map   |
| <code>_nGramMemFactor</code> | The N-Gram memory factor needed for the greedy allocator for the unordered_map   |

Definition at line 48 of file c2d\_hybrid\_trie.cpp.

8.6.3.2 `template<typename WordIndexType > uva::smt::bpbdd::server::lm::c2d_hybrid_trie< WordIndexType >::~~c2d_hybrid_trie ( ) [virtual]`

The basic destructor

Definition at line 146 of file c2d\_hybrid\_trie.cpp.

## 8.6.4 Member Function Documentation

8.6.4.1 `template<typename WordIndexType > template<phrase_length CURR_LEVEL> void uva::smt::bpbdd::server::lm::c2d_hybrid_trie< WordIndexType >::add_m_gram ( const model_m_gram & gram ) [inline]`

Allows to retrieve the data storage structure for the M gram with the given M-gram level Id. M-gram context and last word Id. If the storage structure does not exist, return a new one. For more details

See also

LayeredTrieBase

Definition at line 152 of file c2d\_hybrid\_trie.hpp.

**8.6.4.2** `template<typename WordIndexType > bool uva::smt::bpbd::server::lm::c2d_hybrid_trie< WordIndexType >::get_ctx_id ( const phrase_length level_idx, const TShortId word_id, TLongId & ctx_id ) const [inline]`

Computes the M-Gram context using the previous context and the current word id

See also

LayeredTrieBase

Definition at line 115 of file c2d\_hybrid\_trie.hpp.

**8.6.4.3** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_hybrid_trie< WordIndexType >::get_m_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to retrieve the payload for the M-gram defined by the end word\_id and ctx\_id.

See also

GenericTrieBase

Definition at line 206 of file c2d\_hybrid\_trie.hpp.

**8.6.4.4** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_hybrid_trie< WordIndexType >::get_n_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for m==n

See also

GenericTrieBase

Definition at line 244 of file c2d\_hybrid\_trie.hpp.

**8.6.4.5** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_hybrid_trie< WordIndexType >::get_unigram_payload ( m_gram_query & query ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for m==1. The retrieval of a uni-gram data is always a success

See also

GenericTrieBase

Definition at line 191 of file c2d\_hybrid\_trie.hpp.

**8.6.4.6** `template<typename WordIndexType > float uva::smt::bpbd::server::lm::c2d_hybrid_trie< WordIndexType >::get_unk_word_prob ( ) const [inline]`

Allows to retrieve the unknown target word log probability penalty

Returns

the target source word log probability penalty

Definition at line 107 of file c2d\_hybrid\_trie.hpp.

**8.6.4.7** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_hybrid_trie< WordIndexType >::log_model_type_info ( ) const [inline]`

Allows to log the information about the instantiated trie type

Definition at line 134 of file `c2d_hybrid_trie.hpp`.

**8.6.4.8** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_hybrid_trie< WordIndexType >::pre_allocate ( const size_t counts[LM_M_GRAM_LEVEL_MAX] ) [virtual]`

This method can be used to provide the N-gram count information That should allow for pre-allocation of the memory  
For more details

See also

[LayeredTrieBase](#)

Definition at line 122 of file `c2d_hybrid_trie.cpp`.

**8.6.4.9** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_hybrid_trie< WordIndexType >::set_def_unk_word_prob ( const prob_weight prob )`

See also

[word\\_index\\_trie\\_base](#)

Definition at line 84 of file `c2d_hybrid_trie.cpp`.

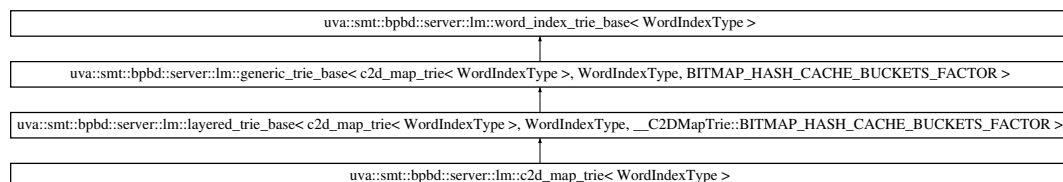
The documentation for this class was generated from the following files:

- `inc/server/lm/models/c2d_hybrid_trie.hpp`
- `src/server/lm/models/c2d_hybrid_trie.cpp`

## 8.7 `uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >` Class Template Reference

`#include <c2d_map_trie.hpp>`

Inheritance diagram for `uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >`:



### Public Types

- `typedef layered_trie_base< c2d_map_trie< WordIndexType >, WordIndexType, __C2DMapTrie::BITMAP_HASH_CACHE_BUCKETS_FACTOR > BASE`



If a factor is equal to 0.0 then no memory is pre-allocated. If the factor is equal to 1.0 then there is only as much preallocated as needed to store the gram entries. The latter is typically not enough as unordered\_map needs more memory for internal administration. If there is not enough memory pre-allocated then additional allocations will take place but it does not always lead to more efficient memory usage. The observed behavior is that it is better to pre-allocate a bit more memory beforehand, than needed. This leads to less memory consumption. Depending on the type of unordered\_map key/value pair types the advised factor values are from 2.0 to 2.6. Because it can not be optimally determined beforehand, these are made constructor parameters so that they can be configured by the user. This breaks encapsulation a bit, exposing the internals, but there is no other better way, for fine tuning the memory usage.

#### Parameters

|                         |                                                                                |
|-------------------------|--------------------------------------------------------------------------------|
| <i>word_index</i>       | the word index to be used                                                      |
| <i>mgram_mem_factor</i> | The M-Gram memory factor needed for the greedy allocator for the unordered_map |
| <i>ngram_mem_factor</i> | The N-Gram memory factor needed for the greedy allocator for the unordered_map |

Definition at line 48 of file c2d\_map\_trie.cpp.

**8.7.3.2** `template<typename WordIndexType > uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::~c2d_map_trie ( ) [virtual]`

The basic destructor

Definition at line 133 of file c2d\_map\_trie.cpp.

## 8.7.4 Member Function Documentation

**8.7.4.1** `template<typename WordIndexType > template<phrase_length CURR_LEVEL> void uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::add_m_gram ( const model_m_gram & gram ) [inline]`

Allows to retrieve the data storage structure for the M gram with the given M-gram level Id. M-gram context and last word Id. If the storage structure does not exist, return a new one. For more details

See also

LayeredTrieBase

Definition at line 158 of file c2d\_map\_trie.hpp.

**8.7.4.2** `template<typename WordIndexType > bool uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::get_ctx_id ( const phrase_length level_idx, const TShortId word_id, TLongId & ctx_id ) const [inline]`

Computes the M-Gram context using the previous context and the current word id

See also

LayeredTrieBase

Definition at line 130 of file c2d\_map\_trie.hpp.

**8.7.4.3** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::get_m_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to retrieve the payload for the M-gram defined by the end word\_id and ctx\_id. For more details

See also

LayeredTrieBase

Definition at line 204 of file c2d\_map\_trie.hpp.

**8.7.4.4** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::get_n_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for m==n

See also

GenericTrieBase

Definition at line 250 of file c2d\_map\_trie.hpp.

**8.7.4.5** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::get_unigram_payload ( m_gram_query & query ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for m==1. The retrieval of a uni-gram data is always a success

See also

GenericTrieBase

Definition at line 189 of file c2d\_map\_trie.hpp.

**8.7.4.6** `template<typename WordIndexType > float uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::get_unk_word_prob ( ) const [inline]`

Allows to retrieve the unknown target word log probability penalty

Returns

the target source word log probability penalty

Definition at line 122 of file c2d\_map\_trie.hpp.

**8.7.4.7** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::log_model_type_info ( ) const [inline]`

Allows to log the information about the instantiated trie type

Definition at line 140 of file c2d\_map\_trie.hpp.

**8.7.4.8** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::pre_allocate ( const size_t counts[LM_M_GRAM_LEVEL_MAX] ) [virtual]`

This method can be used to provide the N-gram count information That should allow for pre-allocation of the memory  
For more details

See also

LayeredTrieBase

Definition at line 117 of file c2d\_map\_trie.cpp.

8.7.4.9 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >::set_def_unk_word_prob ( const prob_weight prob )`

See also

[word\\_index\\_trie\\_base](#)

Definition at line 86 of file `c2d_map_trie.cpp`.

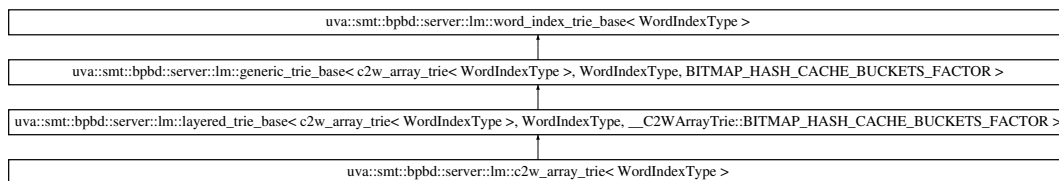
The documentation for this class was generated from the following files:

- `inc/server/lm/models/c2d_map_trie.hpp`
- `src/server/lm/models/c2d_map_trie.cpp`

## 8.8 `uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >` Class Template Reference

```
#include <c2w_array_trie.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >`:



### Classes

- struct [TSubArrReference](#)

### Public Types

- typedef `layered_trie_base< c2w_array_trie< WordIndexType >, WordIndexType, __C2WArrayTrie::BITMAP_HASH_CACHE_BUCKETS_FACTOR >` [BASE](#)

### Public Member Functions

- `c2w_array_trie (WordIndexType &p_word_index)`
- `float get_unk_word_prob () const`
- `bool get_ctx_id (const phrase_length level_idx, const TShortId word_id, TLongId &ctx_id) const`
- `void log_model_type_info () const`
- `virtual void pre_allocate (const size_t counts[LM_M_GRAM_LEVEL_MAX])`
- `void set_def_unk_word_prob (const prob_weight prob)`
- `template<phrase_length level>`  
`bool is_post_grams () const`
- `template<phrase_length CURR_LEVEL>`  
`void post_grams ()`
- `template<phrase_length CURR_LEVEL>`  
`void add_m_gram (const model_m_gram &gram)`
- `void get_unigram_payload (m_gram_query &query) const`
- `void get_m_gram_payload (m_gram_query &query, MGramStatusEnum &status) const`
- `void get_n_gram_payload (m_gram_query &query, MGramStatusEnum &status) const`
- `virtual ~c2w_array_trie ()`



## Protected Types

- typedef [\\_\\_C2WArrayTrie::TWordIdPBData](#) TWordIdPBEntry
- typedef [\\_\\_C2WArrayTrie::TCtxIdProbData](#) TCtxIdProbEntry

## Protected Member Functions

- template<phrase\_length CURR\_LEVEL>  
void [post\\_m\\_grams](#) ()
- void [post\\_n\\_grams](#) ()

## Additional Inherited Members

### 8.8.1 Detailed Description

template<typename WordIndexType>class uva::smt::bpbdd::server::lm::c2w\_array\_trie< WordIndexType >

This is the Context to word array memory trie implementation class.

WARNING: This trie assumes that the M-grams ( $1 \leq M < N$ ) are added to the Trie in an ordered way and there are no duplicates in the 1-Grams. The order is assumed to be lexicographical as in the ARPA files! This is also checked if the sanity checks are on see Globals.hpp!

#### Parameters

|          |                                           |
|----------|-------------------------------------------|
| <i>N</i> | the maximum number of levels in the trie. |
|----------|-------------------------------------------|

Definition at line 144 of file c2w\_array\_trie.hpp.

### 8.8.2 Member Typedef Documentation

8.8.2.1 template<typename WordIndexType > typedef layered\_trie\_base<c2w\_array\_trie<WordIndexType>, WordIndexType, \_\_C2WArrayTrie::BITMAP\_HASH\_CACHE\_BUCKETS\_FACTOR> uva::smt::bpbdd::server::lm::c2w\_array\_trie< WordIndexType >::BASE

Definition at line 146 of file c2w\_array\_trie.hpp.

8.8.2.2 template<typename WordIndexType > typedef \_\_C2WArrayTrie::TCtxIdProbData uva::smt::bpbdd::server::lm::c2w\_array\_trie< WordIndexType >::TCtxIdProbEntry [protected]

Definition at line 424 of file c2w\_array\_trie.hpp.

8.8.2.3 template<typename WordIndexType > typedef \_\_C2WArrayTrie::TWordIdPBData uva::smt::bpbdd::server::lm::c2w\_array\_trie< WordIndexType >::TWordIdPBEntry [protected]

Definition at line 423 of file c2w\_array\_trie.hpp.

### 8.8.3 Constructor & Destructor Documentation

8.8.3.1 template<typename WordIndexType > uva::smt::bpbdd::server::lm::c2w\_array\_trie< WordIndexType >::c2w\_array\_trie ( WordIndexType & p\_word\_index ) [explicit]

The basic constructor

## Parameters

|                     |                                       |
|---------------------|---------------------------------------|
| <i>p_word_index</i> | the word index (dictionary) container |
|---------------------|---------------------------------------|

Definition at line 46 of file c2w\_array\_trie.cpp.

**8.8.3.2** `template<typename WordIndexType > uva::smt::bpbdd::server::lm::c2w_array_trie< WordIndexType >::~~c2w_array_trie( ) [virtual]`

The basic destructor

Definition at line 126 of file c2w\_array\_trie.cpp.

## 8.8.4 Member Function Documentation

**8.8.4.1** `template<typename WordIndexType > template<phrase_length CURR_LEVEL> void uva::smt::bpbdd::server::lm::c2w_array_trie< WordIndexType >::add_m_gram( const model_m_gram & gram ) [inline]`

Allows to retrieve the data storage structure for the M gram with the given M-gram level Id. M-gram context and last word Id. If the storage structure does not exist, return a new one. For more details

See also

LayeredTrieBase

Definition at line 259 of file c2w\_array\_trie.hpp.

**8.8.4.2** `template<typename WordIndexType > bool uva::smt::bpbdd::server::lm::c2w_array_trie< WordIndexType >::get_ctx_id( const phrase_length level_idx, const TShortId word_id, TLongId & ctx_id ) const [inline]`

Computes the M-Gram context using the previous context and the current word id

See also

LayeredTrieBase

Definition at line 166 of file c2w\_array\_trie.hpp.

**8.8.4.3** `template<typename WordIndexType > void uva::smt::bpbdd::server::lm::c2w_array_trie< WordIndexType >::get_m_gram_payload( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to retrieve the payload for the M-gram defined by the end word\_id and ctx\_id. For more details

See also

LayeredTrieBase

Definition at line 328 of file c2w\_array\_trie.hpp.

**8.8.4.4** `template<typename WordIndexType > void uva::smt::bpbdd::server::lm::c2w_array_trie< WordIndexType >::get_n_gram_payload( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for m==n

See also

GenericTrieBase

Definition at line 366 of file c2w\_array\_trie.hpp.

**8.8.4.5** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >::get_unigram_payload ( m_gram_query & query ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for m==1. The retrieval of a uni-gram data is always a success

See also

GenericTrieBase

Definition at line 313 of file c2w\_array\_trie.hpp.

**8.8.4.6** `template<typename WordIndexType > float uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >::get_unk_word_prob ( ) const [inline]`

Allows to retrieve the unknown target word log probability penalty

Returns

the target source word log probability penalty

Definition at line 158 of file c2w\_array\_trie.hpp.

**8.8.4.7** `template<typename WordIndexType > template<phrase_length level> bool uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >::is_post_grams ( ) const [inline]`

This method allows to check if post processing should be called after all the X level grams are read. This method is virtual. For more details

See also

WordIndexTrieBase

Definition at line 224 of file c2w\_array\_trie.hpp.

**8.8.4.8** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >::log_model_type_info ( ) const [inline]`

Allows to log the information about the instantiated trie type

Definition at line 202 of file c2w\_array\_trie.hpp.

**8.8.4.9** `template<typename WordIndexType > template<phrase_length CURR_LEVEL> void uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >::post_grams ( ) [inline]`

This method should be called after all the X level grams are read. For more details

See also

WordIndexTrieBase

Definition at line 236 of file c2w\_array\_trie.hpp.

```
8.8.4.10 template<typename WordIndexType > template<phrase_length CURR_LEVEL> void uva::smt<
::bpbdd::server::lm::c2w_array_trie< WordIndexType >::post_n_grams () [inline],
[protected]
```

Definition at line 427 of file c2w\_array\_trie.hpp.

```
8.8.4.11 template<typename WordIndexType > void uva::smt::bpbdd::server::lm::c2w_array_trie< WordIndexType
>::post_n_grams () [inline],[protected]
```

Definition at line 447 of file c2w\_array\_trie.hpp.

```
8.8.4.12 template<typename WordIndexType > void uva::smt::bpbdd::server::lm::c2w_array_trie< WordIndexType
>::pre_allocate (const size_t counts[LM_M_GRAM_LEVEL_MAX]) [virtual]
```

This method can be used to provide the N-gram count information That should allow for pre-allocation of the memory For more details

See also

[LayeredTrieBase](#)

Definition at line 65 of file c2w\_array\_trie.cpp.

```
8.8.4.13 template<typename WordIndexType > void uva::smt::bpbdd::server::lm::c2w_array_trie< WordIndexType
>::set_def_unk_word_prob (const prob_weight prob)
```

See also

[word\\_index\\_trie\\_base](#)

Definition at line 118 of file c2w\_array\_trie.cpp.

The documentation for this class was generated from the following files:

- [inc/server/lm/models/c2w\\_array\\_trie.hpp](#)
- [src/server/lm/models/c2w\\_array\\_trie.cpp](#)

## 8.9 uva::utils::containers::circular\_queue< elem\_type, capacity > Class Template Reference

```
#include <circular_queue.hpp>
```

### Public Member Functions

- [circular\\_queue](#) ()
- [circular\\_queue](#) (const size\_t num\_elems, const elem\_type \*elems)
- [circular\\_queue](#) (const [circular\\_queue](#) &other, const size\_t num\_elems, const elem\_type \*elems)
- [~circular\\_queue](#) ()
- string [tail\\_to\\_string](#) (const size\_t num\_elems) const
- bool [is\\_equal\\_last](#) (const [circular\\_queue](#) &other, const size\_t num\_elems) const
- void [empty\\_queue](#) ()
- size\_t [get\\_size](#) () const
- const elem\_type \* [get\\_elems](#) () const
- size\_t [get\\_capacity](#) () const
- void [push\\_back](#) (const elem\_type &elem)
- void [push\\_back](#) (const size\_t num\_elems, const elem\_type \*elems)

### 8.9.1 Detailed Description

```
template<typename elem_type, size_t capacity> class uva::utils::containers::circular_queue< elem_type, capacity >
```

This class represents a circular queue class that is needed to store a limited and fixed amount of elements. This queue is designed to store only basic type elements WARNING: Class does a shallow copy of elements using the memcp! So do not store here complex data structures with pointers and the overridden assign operator! WARNING: When comparing elements of the queue does a byte comparison with memcmp and not the == operator!

Definition at line 59 of file circular\_queue.hpp.

### 8.9.2 Constructor & Destructor Documentation

8.9.2.1 `template<typename elem_type, size_t capacity> uva::utils::containers::circular_queue< elem_type, capacity >::circular_queue( ) [inline]`

The basic constructor

Definition at line 65 of file circular\_queue.hpp.

8.9.2.2 `template<typename elem_type, size_t capacity> uva::utils::containers::circular_queue< elem_type, capacity >::circular_queue( const size_t num_elems, const elem_type * elems ) [inline]`

The basic constructor

Parameters

|                  |                                              |
|------------------|----------------------------------------------|
| <i>num_elems</i> | the number of elements to put into the queue |
| <i>elems</i>     | the elements to put into the queue           |

Definition at line 76 of file circular\_queue.hpp.

8.9.2.3 `template<typename elem_type, size_t capacity> uva::utils::containers::circular_queue< elem_type, capacity >::circular_queue( const circular_queue< elem_type, capacity > & other, const size_t num_elems, const elem_type * elems ) [inline]`

The special case of a copy constructor, it allows to take the parameter queue together with the extra elements and copy them into the given queue. This is done in a smart way to optimize performance.

Parameters

|                  |                                                  |
|------------------|--------------------------------------------------|
| <i>other</i>     | the other queue to copy from                     |
| <i>num_elems</i> | the number of extra elements                     |
| <i>elems</i>     | the pointer to the array with the extra elements |

Definition at line 95 of file circular\_queue.hpp.

8.9.2.4 `template<typename elem_type, size_t capacity> uva::utils::containers::circular_queue< elem_type, capacity >::~~circular_queue( ) [inline]`

The basic destructor

Definition at line 139 of file circular\_queue.hpp.

### 8.9.3 Member Function Documentation

**8.9.3.1** `template<typename elem_type , size_t capacity> void uva::utils::containers::circular_queue< elem_type, capacity >::empty_queue ( ) [inline]`

Allows to empty the queue

Definition at line 187 of file circular\_queue.hpp.

**8.9.3.2** `template<typename elem_type , size_t capacity> size_t uva::utils::containers::circular_queue< elem_type, capacity >::get_capacity ( ) const [inline]`

Allows to obtain the maximum number of elements to store

**Returns**

the maximum number of elements to store

Definition at line 212 of file circular\_queue.hpp.

**8.9.3.3** `template<typename elem_type , size_t capacity> const elem_type* uva::utils::containers::circular_queue< elem_type, capacity >::get_elems ( ) const [inline]`

Allows to obtain the pointer to the array storing the elements

**Returns**

the pointer to the array storing the elements

Definition at line 204 of file circular\_queue.hpp.

**8.9.3.4** `template<typename elem_type , size_t capacity> size_t uva::utils::containers::circular_queue< elem_type, capacity >::get_size ( ) const [inline]`

Allows to obtain the number of stored elements

**Returns**

the number of stored elements

Definition at line 196 of file circular\_queue.hpp.

**8.9.3.5** `template<typename elem_type , size_t capacity> bool uva::utils::containers::circular_queue< elem_type, capacity >::is_equal_last ( const circular_queue< elem_type, capacity > & other, const size_t num_elems ) const [inline]`

Allows to check if a certain amount of this queue last elements is equal to the certain amount of the other queue last elements.

**Parameters**

|                  |                                        |
|------------------|----------------------------------------|
| <i>other</i>     | the other queue to compare with        |
| <i>num_elems</i> | the number of last elements to compare |

**Returns**

true or false depending on? true if both queues have more than or equal to num\_elems elements and the last num\_elems are equal. true if both elements have less than num\_elems but the number of elements is equal and the elements are equal false otherwise

Definition at line 167 of file circular\_queue.hpp.

8.9.3.6 `template<typename elem_type , size_t capacity> void uva::utils::containers::circular_queue< elem_type, capacity >::push_back ( const elem_type & elem ) [inline]`

Allows to put the new element to the end of the queue, potentially pushing out the beginning of the queue element. The latter happens only if the maximum number of elements has been reached before this new element was pushed.

## Parameters

|             |                                       |
|-------------|---------------------------------------|
| <i>elem</i> | the element to be stored in the queue |
|-------------|---------------------------------------|

Definition at line 223 of file circular\_queue.hpp.

**8.9.3.7** `template<typename elem_type , size_t capacity> void uva::utils::containers::circular_queue< elem_type, capacity >::push_back ( const size_t num_elems, const elem_type * elems ) [inline]`

Allows to push back an entire array

Definition at line 230 of file circular\_queue.hpp.

**8.9.3.8** `template<typename elem_type , size_t capacity> string uva::utils::containers::circular_queue< elem_type, capacity >::tail_to_string ( const size_t num_elems ) const [inline]`

Allows to get a string representation of the the specified number of tail elements. If there is less elements present in the queue then we represent as many as there are:

## Parameters

|                  |                                          |
|------------------|------------------------------------------|
| <i>num_elems</i> | the number of tail elements to represent |
|------------------|------------------------------------------|

## Returns

the string of tail elements

Definition at line 149 of file circular\_queue.hpp.

The documentation for this class was generated from the following file:

- [inc/common/utis/containers/circular\\_queue.hpp](#)

## 8.10 uva::smt::bpbd::client::client\_config Struct Reference

```
#include <client_config.hpp>
```

### Public Attributes

- string [m\\_source\\_file](#)
- string [m\\_source\\_lang](#)
- string [m\\_target\\_file](#)
- string [m\\_target\\_lang](#)
- string [m\\_server](#)
- uint16\_t [m\\_port](#)
- uint64\_t [m\\_max\\_sent](#)
- uint64\_t [m\\_min\\_sent](#)
- bool [is\\_pre\\_process](#)

### 8.10.1 Detailed Description

This structure stores the translation client execution parameters

Definition at line 37 of file client\_config.hpp.



## 8.10.2 Member Data Documentation

### 8.10.2.1 bool uva::smt::bpbd::client::client\_config::is\_pre\_process

Definition at line 55 of file client\_config.hpp.

### 8.10.2.2 uint64\_t uva::smt::bpbd::client::client\_config::m\_max\_sent

Definition at line 51 of file client\_config.hpp.

### 8.10.2.3 uint64\_t uva::smt::bpbd::client::client\_config::m\_min\_sent

Definition at line 53 of file client\_config.hpp.

### 8.10.2.4 uint16\_t uva::smt::bpbd::client::client\_config::m\_port

Definition at line 49 of file client\_config.hpp.

### 8.10.2.5 string uva::smt::bpbd::client::client\_config::m\_server

Definition at line 47 of file client\_config.hpp.

### 8.10.2.6 string uva::smt::bpbd::client::client\_config::m\_source\_file

Definition at line 39 of file client\_config.hpp.

### 8.10.2.7 string uva::smt::bpbd::client::client\_config::m\_source\_lang

Definition at line 41 of file client\_config.hpp.

### 8.10.2.8 string uva::smt::bpbd::client::client\_config::m\_target\_file

Definition at line 43 of file client\_config.hpp.

### 8.10.2.9 string uva::smt::bpbd::client::client\_config::m\_target\_lang

Definition at line 45 of file client\_config.hpp.

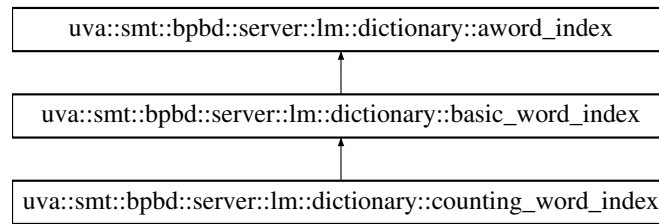
The documentation for this struct was generated from the following file:

- inc/client/[client\\_config.hpp](#)

## 8.11 uva::smt::bpbd::server::lm::dictionary::counting\_word\_index Class Reference

```
#include <counting_word_index.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::lm::dictionary::counting\_word\_index:



## Public Member Functions

- [counting\\_word\\_index](#) (const float mem\_factor)
- bool [is\\_word\\_registering\\_needed](#) () const
- [word\\_uid](#) register\_word (const [text\\_piece\\_reader](#) &token)
- void [count\\_word](#) (const [text\\_piece\\_reader](#) &word, [prob\\_weight](#) prob)
- bool [is\\_word\\_counts\\_needed](#) () const
- void [do\\_post\\_word\\_count](#) ()
- bool [is\\_post\\_actions\\_needed](#) () const
- void [do\\_post\\_actions](#) ()

## Static Public Member Functions

- static constexpr bool [is\\_word\\_index\\_continuous](#) ()

## Additional Inherited Members

### 8.11.1 Detailed Description

This is a hash-map based implementation of the word index which extends the basic word index by word counting. This allows to count the word usages and then to issue lower word indexes to the more frequently used words. This allows for, for example, shorter M-gram ids.

**Todo** {Change or create a new version of the word index that will just use probabilities of the unigrams instead of counting words.}

Definition at line 83 of file `counting_word_index.hpp`.

### 8.11.2 Constructor & Destructor Documentation

8.11.2.1 `uva::smt::bpbd::server::lm::dictionary::counting_word_index::counting_word_index ( const float mem_factor )`  
`[inline]`

The basic constructor

Parameters

|                   |                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------|
| <i>mem_factor</i> | the assigned memory factor for storage allocation in the unordered_map used for the word index |
|-------------------|------------------------------------------------------------------------------------------------|

Definition at line 91 of file `counting_word_index.hpp`.

### 8.11.3 Member Function Documentation

**8.11.3.1** void uva::smt::bpbd::server::lm::dictionary::counting\_word\_index::count\_word ( const text\_piece\_reader & word, prob\_weight prob ) [inline]

This method is to be used when the word counting is needed.

See also

AWordIndex

Definition at line 127 of file counting\_word\_index.hpp.

**8.11.3.2** void uva::smt::bpbd::server::lm::dictionary::counting\_word\_index::do\_post\_actions ( ) [inline]

Is to be called if the post actions are needed right after that all the individual words have been added into the index.

See also

AWordIndex

Definition at line 230 of file counting\_word\_index.hpp.

**8.11.3.3** void uva::smt::bpbd::server::lm::dictionary::counting\_word\_index::do\_post\_word\_count ( ) [inline]

Should be called if the word count is needed after all the words have been counted.

See also

AWordIndex

Definition at line 151 of file counting\_word\_index.hpp.

**8.11.3.4** bool uva::smt::bpbd::server::lm::dictionary::counting\_word\_index::is\_post\_actions\_needed ( ) const [inline]

Indicates if the post-actions are needed. The post actions should be called after all the words have been filled into the index.

See also

AWordIndex

Definition at line 209 of file counting\_word\_index.hpp.

**8.11.3.5** bool uva::smt::bpbd::server::lm::dictionary::counting\_word\_index::is\_word\_counts\_needed ( ) const [inline]

This method allows to indicate whether word counting is needed by the given implementation of the word index.

See also

AWordIndex

Definition at line 141 of file counting\_word\_index.hpp.

**8.11.3.6** `static constexpr bool uva::smt::bpbd::server::lm::dictionary::counting_word_index::is_word_index_continuous ( )`  
`[inline], [static]`

Allows to indicate if the word index is continuous, i.e. it issues the word ids in a continuous range starting from 0.

See also

`AWordIndex`

Returns

true - this word index is continuous.

Definition at line 220 of file `counting_word_index.hpp`.

**8.11.3.7** `bool uva::smt::bpbd::server::lm::dictionary::counting_word_index::is_word_registering_needed ( ) const`  
`[inline]`

This method allows to indicate whether registering a word is needed by the given implementation of the word index.

See also

`AWordIndex`

Definition at line 106 of file `counting_word_index.hpp`.

**8.11.3.8** `word_uid uva::smt::bpbd::server::lm::dictionary::counting_word_index::register_word ( const text_piece_reader`  
`& token ) [inline]`

This function creates/gets a hash for the given word.

See also

`AWordIndex`

Definition at line 115 of file `counting_word_index.hpp`.

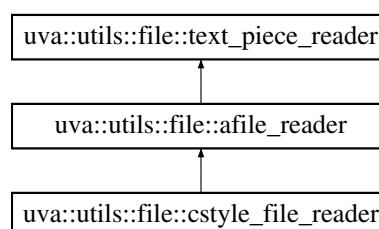
The documentation for this class was generated from the following file:

- `inc/server/lm/dictionaries/counting_word_index.hpp`

## 8.12 `uva::utils::file::cstyle_file_reader` Class Reference

```
#include <cstyle_file_reader.hpp>
```

Inheritance diagram for `uva::utils::file::cstyle_file_reader`:



## Public Member Functions

- [cstyle\\_file\\_reader](#) (const char \*fileName)
- [cstyle\\_file\\_reader](#) (const string &file\_name)
- virtual void [log\\_reader\\_type\\_info](#) ()
- virtual [~cstyle\\_file\\_reader](#) ()
- virtual void [reset](#) ()
- bool [get\\_first\\_line](#) ([text\\_piece\\_reader](#) &out)
- virtual bool [is\\_open](#) () const
- virtual [operator bool](#) () const
- virtual void [close](#) ()

## Additional Inherited Members

### 8.12.1 Detailed Description

The file reader based on the simple C stream, should not use as much memory as MemoryMappedFileReader and potentially is faster than the C++ stream based reader.

Definition at line 51 of file `cstyle_file_reader.hpp`.

### 8.12.2 Constructor & Destructor Documentation

8.12.2.1 `uva::utils::file::cstyle_file_reader::cstyle_file_reader ( const char * fileName )` `[inline]`

The basic constructor

Parameters

|                 |               |
|-----------------|---------------|
| <i>fileName</i> | the file name |
|-----------------|---------------|

Definition at line 66 of file `cstyle_file_reader.hpp`.

8.12.2.2 `uva::utils::file::cstyle_file_reader::cstyle_file_reader ( const string & file_name )` `[inline]`

The basic constructor

Parameters

|                  |               |
|------------------|---------------|
| <i>file_name</i> | the file name |
|------------------|---------------|

Definition at line 87 of file `cstyle_file_reader.hpp`.

8.12.2.3 `virtual uva::utils::file::cstyle_file_reader::~~cstyle_file_reader ( )` `[inline]`, `[virtual]`

Definition at line 97 of file `cstyle_file_reader.hpp`.

### 8.12.3 Member Function Documentation

8.12.3.1 `virtual void uva::utils::file::cstyle_file_reader::close ( )` `[inline]`, `[virtual]`

This method should be used to close the file

Reimplemented from [uva::utils::file::afile\\_reader](#).

Definition at line 156 of file `cstyle_file_reader.hpp`.

**8.12.3.2** `bool uva::utils::file::cstyle_file_reader::get_first_line ( text_piece_reader & out )` `[inline]`

Definition at line 113 of file `cstyle_file_reader.hpp`.

**8.12.3.3** `virtual bool uva::utils::file::cstyle_file_reader::is_open ( ) const` `[inline], [virtual]`

This method is used to check if the file was successfully opened.

#### Returns

true if the file is successfully opened otherwise false.

Implements [uva::utils::file::afile\\_reader](#).

Definition at line 141 of file `cstyle_file_reader.hpp`.

**8.12.3.4** `virtual void uva::utils::file::cstyle_file_reader::log_reader_type_info ( )` `[inline], [virtual]`

Allows to log the information about the instantiated file reader type

Implements [uva::utils::file::afile\\_reader](#).

Definition at line 93 of file `cstyle_file_reader.hpp`.

**8.12.3.5** `virtual uva::utils::file::cstyle_file_reader::operator bool ( ) const` `[inline], [virtual]`

Checks if the file is present.

#### Returns

true if it is

Implements [uva::utils::file::afile\\_reader](#).

Definition at line 149 of file `cstyle_file_reader.hpp`.

**8.12.3.6** `virtual void uva::utils::file::cstyle_file_reader::reset ( )` `[inline], [virtual]`

This method allows to reset the reading process and start reading the file from the first line again. The default implementation throws an exception.

Reimplemented from [uva::utils::file::afile\\_reader](#).

Definition at line 107 of file `cstyle_file_reader.hpp`.

The documentation for this class was generated from the following file:

- `inc/common/utis/file/cstyle_file_reader.hpp`

## 8.13 `uva::smt::bpbdd::server::decoder::de_configurator` Class Reference

```
#include <de_configurator.hpp>
```

### Static Public Member Functions

- static void [connect](#) (const [de\\_parameters](#) &params)

- static void [disconnect](#) ()
- static [sentence\\_decoder](#) & [allocate\\_decoder](#) ([acr\\_bool\\_flag](#) is\_stop, const string &source\_sent, string &target\_sent)
- static void [dispose\\_decoder](#) ([sentence\\_decoder](#) &dec)

### 8.13.1 Detailed Description

This class represents a singleton that allows to configure the decoding server that can create decoder instances. The interface is implemented as the configurations to the translation, reordering, and language models

Definition at line 48 of file `de_configurator.hpp`.

### 8.13.2 Member Function Documentation

**8.13.2.1** static [sentence\\_decoder](#)& `uva::smt::bpbd::server::decoder::de_configurator::allocate_decoder ( acr\_bool\_flag is_stop, const string & source_sent, string & target_sent )` `[inline], [static]`

Allows to get an instance of the decoder object.

**Todo** Pre-allocate decoders, make as many as there are threads

#### Parameters

|                    |                                                                                                                                 |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <i>is_stop</i>     | the flag that will be set to true in case one needs to abort the translation process.                                           |
| <i>source_sent</i> | [in] the source language sentence to translate the source sentence is expected to be tokenized, reduced, and in the lower case. |
| <i>target_sent</i> | [out] the resulting target language sentence                                                                                    |

#### Returns

an instance of the decoder object.

Definition at line 79 of file `de_configurator.hpp`.

**8.13.2.2** static void `uva::smt::bpbd::server::decoder::de_configurator::connect ( const de\_parameters & params )` `[inline], [static]`

This method allows to "connect" to the decoder. The latter means configure it using the given data.

#### Parameters

|               |                                                                                           |
|---------------|-------------------------------------------------------------------------------------------|
| <i>params</i> | the decoder parameters to be used, this class only stores the referent to the parameters. |
|---------------|-------------------------------------------------------------------------------------------|

Definition at line 57 of file `de_configurator.hpp`.

**8.13.2.3** static void `uva::smt::bpbd::server::decoder::de_configurator::disconnect ( )` `[inline], [static]`

Allows to disconnect from the decoder, i.e. clean up the memory etc.

Definition at line 64 of file `de_configurator.hpp`.

**8.13.2.4** static void `uva::smt::bpbd::server::decoder::de_configurator::dispose_decoder ( sentence\_decoder & dec )` `[inline], [static]`

Allows to dispose the decoder

**Todo** Mark the decoder instance as available

## Parameters

|            |                            |
|------------|----------------------------|
| <i>dec</i> | the decoder to be returned |
|------------|----------------------------|

Definition at line 92 of file `de_configurator.hpp`.

The documentation for this class was generated from the following files:

- `inc/server/decoder/de_configurator.hpp`
- `src/server/decoder/de_configurator.cpp`

## 8.14 uva::smt::bpbd::server::decoder::de\_parameters\_struct Struct Reference

```
#include <de_parameters.hpp>
```

### Public Member Functions

- `de_parameters_struct ()`
- `de_parameters_struct & operator= (const de_parameters_struct &other)`
- `de_parameters_struct (const de_parameters_struct &other)`
- `void finalize ()`

### Public Attributes

- `atomic< int32_t > m_distortion`
- `atomic< bool > m_is_dist`
- `atomic< uint32_t > m_ext_dist_left`
- `phrase_length m_max_s_phrase_len`
- `phrase_length m_max_t_phrase_len`
- `atomic< float > m_pruning_threshold`
- `atomic< uint32_t > m_stack_capacity`
- `atomic< float > m_word_penalty`
- `atomic< float > m_phrase_penalty`
- `atomic< uint32_t > m_num_best_trans`
- `atomic< bool > m_is_recombine`

### 8.14.1 Detailed Description

This structure stores the decoder parameters

Definition at line 53 of file `de_parameters.hpp`.

### 8.14.2 Constructor & Destructor Documentation

8.14.2.1 `uva::smt::bpbd::server::decoder::de_parameters_struct::de_parameters_struct ( ) [inline]`

The basic constructor, does nothing

Definition at line 98 of file `de_parameters.hpp`.

8.14.2.2 `uva::smt::bpbd::server::decoder::de_parameters_struct::de_parameters_struct ( const de_parameters_struct & other ) [inline]`

The copy constructor



## Parameters

|              |                              |
|--------------|------------------------------|
| <i>other</i> | the object to construct from |
|--------------|------------------------------|

Definition at line 128 of file de\_parameters.hpp.

### 8.14.3 Member Function Documentation

8.14.3.1 `void uva::smt::bpbd::server::decoder::de_parameters_struct::finalize ( ) [inline]`

Allows to verify the parameters to be correct.

Definition at line 135 of file de\_parameters.hpp.

8.14.3.2 `de_parameters_struct& uva::smt::bpbd::server::decoder::de_parameters_struct::operator= ( const de_parameters_struct & other ) [inline]`

The assignment operator

## Parameters

|              |                           |
|--------------|---------------------------|
| <i>other</i> | the object to assign from |
|--------------|---------------------------|

## Returns

this object updated with new values

Definition at line 106 of file de\_parameters.hpp.

### 8.14.4 Member Data Documentation

8.14.4.1 `atomic<int32_t> uva::smt::bpbd::server::decoder::de_parameters_struct::m_distortion`

Definition at line 57 of file de\_parameters.hpp.

8.14.4.2 `atomic<uint32_t> uva::smt::bpbd::server::decoder::de_parameters_struct::m_ext_dist_left`

Definition at line 68 of file de\_parameters.hpp.

8.14.4.3 `atomic<bool> uva::smt::bpbd::server::decoder::de_parameters_struct::m_is_dist`

Definition at line 60 of file de\_parameters.hpp.

8.14.4.4 `atomic<bool> uva::smt::bpbd::server::decoder::de_parameters_struct::m_is_recombine`

Definition at line 93 of file de\_parameters.hpp.

8.14.4.5 `phrase_length uva::smt::bpbd::server::decoder::de_parameters_struct::m_max_s_phrase_len`

Definition at line 71 of file de\_parameters.hpp.

8.14.4.6 `phrase_length uva::smt::bpbd::server::decoder::de_parameters_struct::m_max_t_phrase_len`

Definition at line 73 of file de\_parameters.hpp.

8.14.4.7 `atomic<uint32_t> uva::smt::bpbd::server::decoder::de_parameters_struct::m_num_best_trans`

Definition at line 90 of file `de_parameters.hpp`.

8.14.4.8 `atomic<float> uva::smt::bpbd::server::decoder::de_parameters_struct::m_phrase_penalty`

Definition at line 84 of file `de_parameters.hpp`.

8.14.4.9 `atomic<float> uva::smt::bpbd::server::decoder::de_parameters_struct::m_pruning_threshold`

Definition at line 78 of file `de_parameters.hpp`.

8.14.4.10 `atomic<uint32_t> uva::smt::bpbd::server::decoder::de_parameters_struct::m_stack_capacity`

Definition at line 80 of file `de_parameters.hpp`.

8.14.4.11 `atomic<float> uva::smt::bpbd::server::decoder::de_parameters_struct::m_word_penalty`

Definition at line 82 of file `de_parameters.hpp`.

The documentation for this struct was generated from the following file:

- [inc/server/decoder/de\\_parameters.hpp](#)

## 8.15 `uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >` Class Template Reference

```
#include <dynamic_memory_arrays.hpp>
```

### Public Types

- `typedef ELEMENT_TYPE TElemType`
- `typedef IDX_DATA_TYPE TIndexType`
- `typedef ELEMENT_TYPE * ELEMENT_TYPE_PTR`

### Public Member Functions

- `dynamic_stack_array ()`
- `void pre_allocate (const IDX_DATA_TYPE capacity)`
- `ELEMENT_TYPE & allocate ()`
- `void shrink ()`
- `const ELEMENT_TYPE & operator[] (IDX_DATA_TYPE idx) const`
- `IDX_DATA_TYPE size () const`
- `const ELEMENT_TYPE * data () const`
- `bool has_data () const`
- `void sort ()`
- `void sort (typename T_IS_COMPARE_FUNC< ELEMENT_TYPE >::func_type is_less_func)`
- `~dynamic_stack_array ()`

## Static Public Attributes

- static const size\_t [MAX\\_SIZE\\_TYPE\\_VALUE](#) = MAX\_U\_TYPE\_VALUES[sizeof (IDX\_DATA\_TYPE) - 1]
- static constexpr size\_t [PARAMETERS\\_SIZE\\_BYTES](#) = (sizeof (ELEMENT\_TYPE\_PTR) + 2 \* sizeof (IDX\_DATA\_TYPE))

### 8.15.1 Detailed Description

```
template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> class uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >
```

This class represents a dynamic memory array and stores the main methods needed for its operation

#### Parameters

|                         |                                                                                                   |
|-------------------------|---------------------------------------------------------------------------------------------------|
| <i>ELEMENT_TYPE</i>     | the array element type                                                                            |
| <i>IDX_DATA_TYPE</i>    | the type is to be used for the size, capacity and index variables, should be an unsigned type!    |
| <i>INITIAL_CAPACITY</i> | the number of words, which defines the initial capacity.                                          |
| <i>DESTRUCTOR</i>       | the destructor function to be used on the elements when the container is deleted, default is NULL |

Definition at line 201 of file dynamic\_memory\_arrays.hpp.

### 8.15.2 Member Typedef Documentation

8.15.2.1 `template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> typedef ELEMENT_TYPE* uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::ELEMENT_TYPE_PTR`

Definition at line 211 of file dynamic\_memory\_arrays.hpp.

8.15.2.2 `template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> typedef ELEMENT_TYPE uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::TElemType`

Definition at line 205 of file dynamic\_memory\_arrays.hpp.

8.15.2.3 `template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> typedef IDX_DATA_TYPE uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::TIndexType`

Definition at line 208 of file dynamic\_memory\_arrays.hpp.

### 8.15.3 Constructor & Destructor Documentation

8.15.3.1 `template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::dynamic_stack_array( ) [inline]`

The basic constructor, does not pre-allocate any memory

Definition at line 222 of file `dynamic_memory_arrays.hpp`.

8.15.3.2 `template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::~~dynamic_stack_array( ) [inline]`

The basic destructor

Definition at line 374 of file `dynamic_memory_arrays.hpp`.

### 8.15.4 Member Function Documentation

8.15.4.1 `template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> ELEMENT_TYPE& uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::allocate( ) [inline]`

Allows to retrieve the next new/unused element. Reallocates memory, if needed, to get space for the new element

Returns

the next new element

Definition at line 273 of file `dynamic_memory_arrays.hpp`.

8.15.4.2 `template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> const ELEMENT_TYPE* uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::data( ) const [inline]`

Allows to get the pointer to the stored data, note that this pointer is only guaranteed to be valid until a new element is added to the array, due to possible memory reallocation

Returns

the pointer to the data array

Definition at line 339 of file `dynamic_memory_arrays.hpp`.

8.15.4.3 `template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> bool uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::has_data( ) const [inline]`

Allows to check if there is data stored

## Returns

true if there is at least one data element stored otherwise false

Definition at line 348 of file `dynamic_memory_arrays.hpp`.

```
8.15.4.4 template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY
 = 0, typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR =
 ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> const ELEMENT_TYPE&
 uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY,
 DESTRUCTOR >::operator[] (IDX_DATA_TYPE idx) const [inline]
```

This operator allows to retrieve the reference to an array element by the given index

## Parameters

|            |                         |
|------------|-------------------------|
| <i>idx</i> | the array element index |
|------------|-------------------------|

## Returns

the reference to the array element under the given index

## Exceptions

|                     |                                                   |
|---------------------|---------------------------------------------------|
| <i>out_of_range</i> | exception if the index is outside the array size. |
|---------------------|---------------------------------------------------|

Definition at line 310 of file `dynamic_memory_arrays.hpp`.

```
8.15.4.5 template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0,
 typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> void uva::utils::containers::dynamic_stack_array<
 ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::pre_allocate (const IDX_DATA_TYPE
 capacity) [inline]
```

Allows pre-allocate some capacity

## Parameters

|                 |                              |
|-----------------|------------------------------|
| <i>capacity</i> | the capacity to pre-allocate |
|-----------------|------------------------------|

Definition at line 259 of file `dynamic_memory_arrays.hpp`.

```
8.15.4.6 template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename
 ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> void uva::utils::containers::dynamic_stack_array<
 ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::shrink () [inline]
```

De-allocated the un-used memory, if any

Definition at line 295 of file `dynamic_memory_arrays.hpp`.

```
8.15.4.7 template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename
 ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> IDX_DATA_TYPE uva::utils::containers::dynamic_stack_array<
 ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::size () const [inline]
```

Allows to retrieve the currently used number of elements

**Returns**

the number of elements stored in the stack array.

Definition at line 328 of file `dynamic_memory_arrays.hpp`.

```
8.15.4.8 template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename
 ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> void uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE,
 IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::sort () [inline]
```

Allows to sort the data stored in this stack array. How th data is sorted is defined by the < operator of the ELEMENT\_TYPE

Definition at line 357 of file `dynamic_memory_arrays.hpp`.

```
8.15.4.9 template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename
 ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> void uva::utils::containers::dynamic_stack_array< ELEMENT_TYPE,
 IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::sort (typename T_IS_COMPARE_FUNC<
 ELEMENT_TYPE >::func_type is_less_func) [inline]
```

Allows to sort the data stored in this stack array. How th data is sorted is defined by the < operator of the ELEMENT\_TYPE

Definition at line 366 of file `dynamic_memory_arrays.hpp`.

**8.15.5 Member Data Documentation**

```
8.15.5.1 template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0,
 typename ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> const size_t uva::utils::containers::dynamic_stack_array<
 ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::MAX_SIZE_TYPE_VALUE =
 MAX_U_TYPE_VALUES[sizeof (IDX_DATA_TYPE) - 1] [static]
```

Definition at line 214 of file `dynamic_memory_arrays.hpp`.

```
8.15.5.2 template<typename ELEMENT_TYPE, typename IDX_DATA_TYPE, IDX_DATA_TYPE INITIAL_CAPACITY = 0, typename
 ELEMENT_DEALLOC_FUNC< ELEMENT_TYPE >::func_ptr DESTRUCTOR = ELEMENT_DEALLOC_FUNC<ELEMENT_TYPE>::NULL_FUNC_PTR> constexpr size_t uva::utils::containers::dynamic_stack_array<
 ELEMENT_TYPE, IDX_DATA_TYPE, INITIAL_CAPACITY, DESTRUCTOR >::PARAMETERS_SIZE_BYTES = (sizeof
 (ELEMENT_TYPE_PTR) + 2 * sizeof (IDX_DATA_TYPE)) [static]
```

Definition at line 217 of file `dynamic_memory_arrays.hpp`.

The documentation for this class was generated from the following file:

- [inc/common/utis/containers/dynamic\\_memory\\_arrays.hpp](#)

**8.16 uva::utils::containers::ELEMENT\_DEALLOC\_FUNC< ELEM\_TYPE > Struct Template Reference**

```
#include <dynamic_memory_arrays.hpp>
```

## Public Types

- typedef std::function< void(ELEM\_TYPE &) > [func\\_type](#)
- typedef void(\* [func\\_ptr](#)) (ELEM\_TYPE &)

## Static Public Attributes

- static constexpr [func\\_ptr](#) [NULL\\_FUNC\\_PTR](#) = (typename [ELEMENT\\_DEALLOC\\_FUNC](#)<ELEM\_TYPE>↵  
::func\_ptr)NULL

### 8.16.1 Detailed Description

template<typename ELEM\_TYPE>struct uva::utils::containers::ELEMENT\_DEALLOC\_FUNC< ELEM\_TYPE >

The element deallocator function type for the ADynamicStackArray

Definition at line 186 of file dynamic\_memory\_arrays.hpp.

### 8.16.2 Member Typedef Documentation

8.16.2.1 template<typename ELEM\_TYPE> typedef void(\* uva::utils::containers::ELEMENT\_DEALLOC\_FUNC< ELEM\_TYPE >::func\_ptr) (ELEM\_TYPE &)

Definition at line 188 of file dynamic\_memory\_arrays.hpp.

8.16.2.2 template<typename ELEM\_TYPE> typedef std::function<void(ELEM\_TYPE &) > uva::utils::containers::ELEMENT\_DEALLOC\_FUNC< ELEM\_TYPE >::func\_type

Definition at line 187 of file dynamic\_memory\_arrays.hpp.

### 8.16.3 Member Data Documentation

8.16.3.1 template<typename ELEM\_TYPE> constexpr func\_ptr uva::utils::containers↵  
::ELEMENT\_DEALLOC\_FUNC< ELEM\_TYPE >::NULL\_FUNC\_PTR = (typename  
ELEMENT\_DEALLOC\_FUNC<ELEM\_TYPE>::func\_ptr)NULL [static]

Definition at line 189 of file dynamic\_memory\_arrays.hpp.

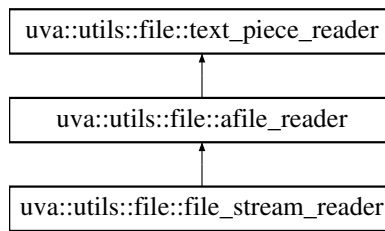
The documentation for this struct was generated from the following file:

- inc/common/utils/containers/[dynamic\\_memory\\_arrays.hpp](#)

## 8.17 uva::utils::file::file\_stream\_reader Class Reference

```
#include <file_stream_reader.hpp>
```

Inheritance diagram for uva::utils::file::file\_stream\_reader:



## Public Member Functions

- [file\\_stream\\_reader](#) (const char \*fileName)
- virtual void [log\\_reader\\_type\\_info](#) ()
- virtual [~file\\_stream\\_reader](#) ()
- virtual void [reset](#) ()
- bool [get\\_first\\_line](#) ([text\\_piece\\_reader](#) &out)
- virtual bool [is\\_open](#) () const
- virtual [operator bool](#) () const
- virtual void [close](#) ()

## Additional Inherited Members

### 8.17.1 Detailed Description

The file reader based on the simple ifstream, should not use as much memory as MemoryMappedFileReader and is seemingly as fast as the latter one on our applications.

Definition at line 49 of file file\_stream\_reader.hpp.

### 8.17.2 Constructor & Destructor Documentation

#### 8.17.2.1 uva::utils::file::file\_stream\_reader::file\_stream\_reader ( const char \* *fileName* ) [inline]

The basic constructor

Parameters

|                 |               |
|-----------------|---------------|
| <i>fileName</i> | the file name |
|-----------------|---------------|

Definition at line 62 of file file\_stream\_reader.hpp.

#### 8.17.2.2 virtual uva::utils::file::file\_stream\_reader::~~file\_stream\_reader ( ) [inline],[virtual]

Definition at line 79 of file file\_stream\_reader.hpp.

### 8.17.3 Member Function Documentation

#### 8.17.3.1 virtual void uva::utils::file::file\_stream\_reader::close ( ) [inline],[virtual]

This method should be used to close the file

Reimplemented from [uva::utils::file::afire\\_reader](#).

Definition at line 138 of file file\_stream\_reader.hpp.



8.17.3.2 `bool uva::utils::file::file_stream_reader::get_first_line ( text_piece_reader & out ) [inline]`

Definition at line 91 of file file\_stream\_reader.hpp.

8.17.3.3 `virtual bool uva::utils::file::file_stream_reader::is_open ( ) const [inline],[virtual]`

This method is used to check if the file was successfully opened.

#### Returns

true if the file is successfully opened otherwise false.

Implements [uva::utils::file::afile\\_reader](#).

Definition at line 123 of file file\_stream\_reader.hpp.

8.17.3.4 `virtual void uva::utils::file::file_stream_reader::log_reader_type_info ( ) [inline],[virtual]`

Allows to log the information about the instantiated file reader type

Implements [uva::utils::file::afile\\_reader](#).

Definition at line 75 of file file\_stream\_reader.hpp.

8.17.3.5 `virtual uva::utils::file::file_stream_reader::operator bool ( ) const [inline],[virtual]`

Checks if the file is present.

#### Returns

true if it is

Implements [uva::utils::file::afile\\_reader](#).

Definition at line 131 of file file\_stream\_reader.hpp.

8.17.3.6 `virtual void uva::utils::file::file_stream_reader::reset ( ) [inline],[virtual]`

This method allows to reset the reading process and start reading the file from the first line again. The default implementation throws an exception.

Reimplemented from [uva::utils::file::afile\\_reader](#).

Definition at line 86 of file file\_stream\_reader.hpp.

The documentation for this class was generated from the following file:

- inc/common/utis/file/[file\\_stream\\_reader.hpp](#)

## 8.18 uva::utils::containers::fixed\_size\_hashmap< ELEMENT\_TYPE, KEY\_TYPE, IDX\_TYPE > Class Template Reference

```
#include <fixed_size_hashmap.hpp>
```

### Public Types

- typedef ELEMENT\_TYPE [TElemType](#)

## Public Member Functions

- [fixed\\_size\\_hashmap](#) (const double buckets\_factor, const IDX\_TYPE num\_elems)
- ELEMENT\_TYPE & [add\\_new\\_element](#) (const uint\_fast64\_t key\_uid)
- ELEMENT\_TYPE \* [get\\_element](#) (const uint\_fast64\_t key\_uid, const KEY\_TYPE &key) const
- [~fixed\\_size\\_hashmap](#) ()

## Public Attributes

- const IDX\_TYPE [MAX\\_ELEMENT\\_INDEX](#)

## Static Public Attributes

- static constexpr IDX\_TYPE [NO\\_ELEMENT\\_INDEX](#) = 0
- static constexpr IDX\_TYPE [MIN\\_ELEMENT\\_INDEX](#) = [NO\\_ELEMENT\\_INDEX](#) + 1

### 8.18.1 Detailed Description

```
template<typename ELEMENT_TYPE, typename KEY_TYPE, typename IDX_TYPE = uint32_t>class uva::utils::containers::fixed_size_hashmap< ELEMENT_TYPE, KEY_TYPE, IDX_TYPE >
```

This class represents a fixed size hash map that stores a pre-defined number of elements. This is a linear probing hash map implementation, the linear probing hash map is currently known to be the fastest hash map there is, see: "Fast and Compact Hash Tables for Integer Keys" by Nikolas Askitis

#### Parameters

|                     |                                                                                                                                                                                                                                                                                                                       |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ELEMENT_TYPE</i> | the element type, this type is expected to have the following interface: <ol style="list-style-type: none"> <li>1. operator==(const KEY_TYPE &amp;); the comparison operator for the key value</li> <li>2. static void clear(ELEMENT_TYPE &amp; ); the cleaning method to destroy contents of the element.</li> </ol> |
| <i>KEY_TYPE</i>     | the key type for retrieving the element                                                                                                                                                                                                                                                                               |
| <i>IDX_TYPE</i>     | the index type, is related to the number of elements                                                                                                                                                                                                                                                                  |

Definition at line 57 of file fixed\_size\_hashmap.hpp.

### 8.18.2 Member Typedef Documentation

8.18.2.1 `template<typename ELEMENT_TYPE , typename KEY_TYPE , typename IDX_TYPE = uint32_t> typedef ELEMENT_TYPE uva::utils::containers::fixed_size_hashmap< ELEMENT_TYPE, KEY_TYPE, IDX_TYPE >::TElemType`

Definition at line 59 of file fixed\_size\_hashmap.hpp.

### 8.18.3 Constructor & Destructor Documentation

8.18.3.1 `template<typename ELEMENT_TYPE , typename KEY_TYPE , typename IDX_TYPE = uint32_t> uva::utils::containers::fixed_size_hashmap< ELEMENT_TYPE, KEY_TYPE, IDX_TYPE >::fixed_size_hashmap ( const double buckets_factor, const IDX_TYPE num_elems ) [inline], [explicit]`

The basic constructor that allows to instantiate the map for the given number of elements. The number of buckets is computed based on the value: buckets\_factor \* (num\_elems + 1) The latter is then rounded up to the next integer

being a power of two. The latter is needed to speed up the internal index computations.

## Parameters

|                       |                                                                         |
|-----------------------|-------------------------------------------------------------------------|
| <i>buckets_factor</i> | the factor to compute the number of buckets from the number of elements |
| <i>num_elems</i>      | the number of elements that will be stored in the map                   |

Definition at line 77 of file `fixed_size_hashmap.hpp`.

```
8.18.3.2 template<typename ELEMENT_TYPE , typename KEY_TYPE , typename IDX_TYPE = uint32_t>
 uva::utils::containers::fixed_size_hashmap< ELEMENT_TYPE, KEY_TYPE, IDX_TYPE
 >::~fixed_size_hashmap() [inline]
```

The basic destructor

Definition at line 172 of file `fixed_size_hashmap.hpp`.

## 8.18.4 Member Function Documentation

```
8.18.4.1 template<typename ELEMENT_TYPE , typename KEY_TYPE , typename IDX_TYPE = uint32_t> ELEMENT_TYPE&
 uva::utils::containers::fixed_size_hashmap< ELEMENT_TYPE, KEY_TYPE, IDX_TYPE >::add_new_element (
 const uint_fast64_t key_uid) [inline]
```

Allows to add a new element for the given hash value

## Parameters

|                |                                                                                                                                                                                                               |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>key_uid</i> | the unique identifier representing the actual key value of the element. It can be e.g. a hash value of the key. Note that if one uses hash for a key uid then he or she has to accept the risk of collisions. |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Returns

the reference to the new element

Definition at line 97 of file `fixed_size_hashmap.hpp`.

```
8.18.4.2 template<typename ELEMENT_TYPE , typename KEY_TYPE , typename IDX_TYPE = uint32_t> ELEMENT_TYPE*
 uva::utils::containers::fixed_size_hashmap< ELEMENT_TYPE, KEY_TYPE, IDX_TYPE >::get_element (
 const uint_fast64_t key_uid, const KEY_TYPE & key) const [inline]
```

Allows to retrieve the element for the given hash value and key

## Parameters

|                |                                                                                                                                                                                                               |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>key_uid</i> | the unique identifier representing the actual key value of the element. It can be e.g. a hash value of the key. Note that if one uses hash for a key uid then he or she has to accept the risk of collisions. |
| <i>key</i>     | the key value of the element                                                                                                                                                                                  |

## Returns

the pointer to the found element or NULL if nothing is found

Definition at line 144 of file `fixed_size_hashmap.hpp`.

## 8.18.5 Member Data Documentation

8.18.5.1 `template<typename ELEMENT_TYPE , typename KEY_TYPE , typename IDX_TYPE = uint32_t> const  
IDX_TYPE uva::utils::containers::fixed_size_hashmap< ELEMENT_TYPE, KEY_TYPE, IDX_TYPE  
>::MAX_ELEMENT_INDEX`

Definition at line 66 of file `fixed_size_hashmap.hpp`.

8.18.5.2 `template<typename ELEMENT_TYPE , typename KEY_TYPE , typename IDX_TYPE = uint32_t> constexpr  
IDX_TYPE uva::utils::containers::fixed_size_hashmap< ELEMENT_TYPE, KEY_TYPE, IDX_TYPE  
>::MIN_ELEMENT_INDEX = NO_ELEMENT_INDEX + 1 [static]`

Definition at line 64 of file `fixed_size_hashmap.hpp`.

8.18.5.3 `template<typename ELEMENT_TYPE , typename KEY_TYPE , typename IDX_TYPE = uint32_t> constexpr  
IDX_TYPE uva::utils::containers::fixed_size_hashmap< ELEMENT_TYPE, KEY_TYPE, IDX_TYPE  
>::NO_ELEMENT_INDEX = 0 [static]`

Definition at line 62 of file `fixed_size_hashmap.hpp`.

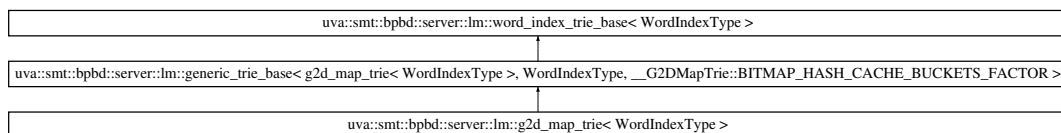
The documentation for this class was generated from the following file:

- `inc/common/utis/containers/fixed_size_hashmap.hpp`

## 8.19 uva::smt::bpbdd::server::lm::g2d\_map\_trie< WordIndexType > Class Template Reference

`#include <g2d_map_trie.hpp>`

Inheritance diagram for `uva::smt::bpbdd::server::lm::g2d_map_trie< WordIndexType >`:



### Public Types

- typedef `generic_trie_base< g2d_map_trie< WordIndexType >, WordIndexType, __G2DMapTrie::BITMAP_HASH_CACHE_BUCKETS_FACTOR >` `BASE`
- typedef `__G2DMapTrie::S_M_GramData< m_gram_payload, word_uid >` `T_M_Gram_PB_Entry`
- typedef `__G2DMapTrie::S_M_GramData< prob_weight, word_uid >` `T_M_Gram_Prob_Entry`

### Public Member Functions

- `g2d_map_trie (WordIndexType &word_index)`
- `float get_unk_word_prob () const`
- `void log_model_type_info () const`
- `void set_def_unk_word_prob (const prob_weight prob)`
- `virtual void pre_allocate (const size_t counts[LM_M_GRAM_LEVEL_MAX])`
- `template<phrase_length CURR_LEVEL>  
void add_m_gram (const model_m_gram &gram)`
- `void get_unigram_payload (m_gram_query &query) const`
- `void get_m_gram_payload (m_gram_query &query, MGramStatusEnum &status) const`

- void [get\\_n\\_gram\\_payload](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const
- virtual [~g2d\\_map\\_trie](#) ()

## Additional Inherited Members

### 8.19.1 Detailed Description

```
template<typename WordIndexType>class uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >
```

This is a Gram to Data trie that is implemented as a HashMap.

#### Parameters

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| <i>M_GRAM_LEVEL_MAX</i> | - the maximum level of the considered N-gram, i.e. the N value |
|-------------------------|----------------------------------------------------------------|

Definition at line 121 of file `g2d_map_trie.hpp`.

### 8.19.2 Member Typedef Documentation

8.19.2.1 `template<typename WordIndexType > typedef generic_trie_base<g2d_map_trie<WordIndexType>, WordIndexType, __G2DMapTrie::BITMAP_HASH_CACHE_BUCKETS_FACTOR> uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::BASE`

Definition at line 123 of file `g2d_map_trie.hpp`.

8.19.2.2 `template<typename WordIndexType > typedef __G2DMapTrie::S_M_GramData<m_gram_payload, word_uid> uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::T_M_Gram_PB_Entry`

Definition at line 124 of file `g2d_map_trie.hpp`.

8.19.2.3 `template<typename WordIndexType > typedef __G2DMapTrie::S_M_GramData<prob_weight, word_uid> uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::T_M_Gram_Prob_Entry`

Definition at line 125 of file `g2d_map_trie.hpp`.

### 8.19.3 Constructor & Destructor Documentation

8.19.3.1 `template<typename WordIndexType > uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::g2d_map_trie ( WordIndexType & word_index ) [explicit]`

The basic constructor

#### Parameters

|                   |                           |
|-------------------|---------------------------|
| <i>_wordIndex</i> | the word index to be used |
|-------------------|---------------------------|

Definition at line 48 of file `g2d_map_trie.cpp`.

8.19.3.2 `template<typename WordIndexType > uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::~~g2d_map_trie ( ) [virtual]`

The basic class destructor

Definition at line 93 of file `g2d_map_trie.cpp`.

## 8.19.4 Member Function Documentation

8.19.4.1 `template<typename WordIndexType > template<phrase_length CURR_LEVEL> void uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::add_m_gram ( const model_m_gram & gram ) [inline]`

This method adds a M-Gram (word) to the trie where  $1 < M < N$

See also

GenericTrieBase

Definition at line 167 of file g2d\_map\_trie.hpp.

8.19.4.2 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::get_m_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for  $1 < m < n$

See also

GenericTrieBase

Parameters

|               |                                            |
|---------------|--------------------------------------------|
| <i>query</i>  | the query containing the actual query data |
| <i>status</i> | the resulting status of the operation      |

Definition at line 219 of file g2d\_map\_trie.hpp.

8.19.4.3 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::get_n_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for  $m == n$

See also

GenericTrieBase

Parameters

|               |                                            |
|---------------|--------------------------------------------|
| <i>query</i>  | the query containing the actual query data |
| <i>status</i> | the resulting status of the operation      |

Definition at line 238 of file g2d\_map\_trie.hpp.

8.19.4.4 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::get_unigram_payload ( m_gram_query & query ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for  $m == 1$ . The retrieval of a uni-gram data is always a success.

See also

GenericTrieBase

Definition at line 202 of file g2d\_map\_trie.hpp.

8.19.4.5 `template<typename WordIndexType > float uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::get_unk_word_prob ( ) const [inline]`

Allows to retrieve the unknown target word log probability penalty

#### Returns

the target source word log probability penalty

Definition at line 137 of file g2d\_map\_trie.hpp.

8.19.4.6 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::log_model_type_info ( ) const [inline]`

Allows to log the information about the instantiated trie type

Definition at line 144 of file g2d\_map\_trie.hpp.

8.19.4.7 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::pre_allocate ( const size_t counts[LM_M_GRAM_LEVEL_MAX] ) [virtual]`

This method can be used to provide the N-gram count information That should allow for pre-allocation of the memory

#### See also

[GenericTrieBase](#)

Definition at line 66 of file g2d\_map\_trie.cpp.

8.19.4.8 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::g2d_map_trie< WordIndexType >::set_def_unk_word_prob ( const prob_weight prob )`

#### See also

[word\\_index\\_trie\\_base](#)

Definition at line 85 of file g2d\_map\_trie.cpp.

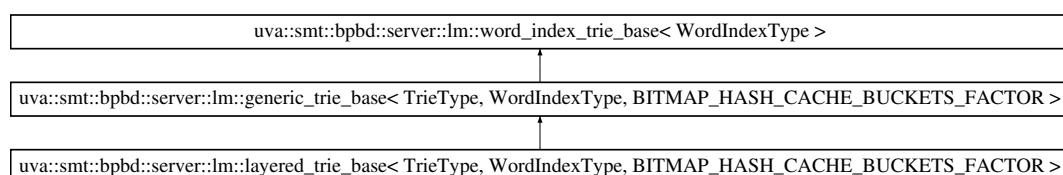
The documentation for this class was generated from the following files:

- [inc/server/lm/models/g2d\\_map\\_trie.hpp](#)
- [src/server/lm/models/g2d\\_map\\_trie.cpp](#)

## 8.20 `uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR >` Class Template Reference

```
#include <generic_trie_base.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR >`:





## Public Types

- typedef [word\\_index\\_trie\\_base](#)< [WordIndexType](#) > [BASE](#)

## Public Member Functions

- [generic\\_trie\\_base](#) ([WordIndexType](#) &word\_index)
- float [get\\_unk\\_word\\_prob](#) () const
- void [pre\\_allocate](#) (const size\_t counts[LM\_M\_GRAM\_LEVEL\_MAX])
- template<phrase\_length CURR\_LEVEL>  
void [add\\_m\\_gram](#) (const [model\\_m\\_gram](#) &gram)
- void [log\\_model\\_type\\_info](#) () const
- void [is\\_m\\_gram\\_potentially\\_present](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const
- void [execute](#) ([m\\_gram\\_query](#) &query) const
- void [get\\_unigram\\_payload](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const
- void [get\\_m\\_gram\\_payload](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const
- void [get\\_n\\_gram\\_payload](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const
- void [register\\_m\\_gram\\_cache](#) (const [model\\_m\\_gram](#) &gram)
- virtual [~generic\\_trie\\_base](#) ()

## Static Public Member Functions

- static constexpr bool [is\\_context\\_needed](#) ()

## Static Public Attributes

- static const bool [NEEDS\\_BITMAP\\_HASH\\_CACHE](#) = (BITMAP\_HASH\_CACHE\_BUCKETS\_FACTOR > 1)
- static const [phrase\\_length](#) [MGRAM\\_IDX\\_OFFSET](#) = 2
- static const [phrase\\_length](#) [NUM\\_M\\_GRAM\\_LEVELS](#) = LM\_M\_GRAM\_LEVEL\_MAX - [MGRAM\\_IDX\\_OFFSET](#)
- static const [phrase\\_length](#) [NUM\\_M\\_N\\_GRAM\\_LEVELS](#) = LM\_M\_GRAM\_LEVEL\_MAX - 1
- static const [phrase\\_length](#) [N\\_GRAM\\_IDX\\_IN\\_M\\_N\\_ARR](#) = LM\_M\_GRAM\_LEVEL\_MAX - [MGRAM\\_IDX\\_OFFSET](#)
- static const [TShortId](#) [UNDEFINED\\_ARR\\_IDX](#) = 0
- static const [TShortId](#) [FIRST\\_VALID\\_CTX\\_ID](#) = [UNDEFINED\\_ARR\\_IDX](#) + 1

## Additional Inherited Members

### 8.20.1 Detailed Description

```
template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>class uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR >
```

This class defined the trie interface and functionality that is expected by the TrieDriver class

Definition at line 99 of file generic\_trie\_base.hpp.

### 8.20.2 Member Typedef Documentation

8.20.2.1 `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR> typedef word_index_trie_base<WordIndexType> uva::smt::bpbd::server::lm::generic_trie_base<TrieType, WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR >::BASE`

Definition at line 102 of file generic\_trie\_base.hpp.

### 8.20.3 Constructor & Destructor Documentation

8.20.3.1 `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>  
uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType, BITMAP_HASH_C←  
ACHE_BUCKETS_FACTOR >::generic_trie_base ( WordIndexType & word_index ) [inline],  
[explicit]`

The basic constructor

Parameters

|                   |                           |
|-------------------|---------------------------|
| <i>word_index</i> | the word index to be used |
|-------------------|---------------------------|

Definition at line 129 of file generic\_trie\_base.hpp.

8.20.3.2 `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>  
virtual uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,  
BITMAP_HASH_CACHE_BUCKETS_FACTOR >::~~generic_trie_base ( ) [inline],[virtual]`

The basic class destructor

Definition at line 346 of file generic\_trie\_base.hpp.

### 8.20.4 Member Function Documentation

8.20.4.1 `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>  
template<phrase_length CURR_LEVEL> void uva::smt::bpbd::server::lm::generic_trie_base< TrieType,  
WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR >::add_m_gram ( const model_m_gram & gram )  
[inline]`

This method adds a M-Gram (word) to the trie where  $1 < M < N$

Parameters

|             |                 |
|-------------|-----------------|
| <i>gram</i> | the M-Gram data |
|-------------|-----------------|

Exceptions

|                  |                                                          |
|------------------|----------------------------------------------------------|
| <i>Exception</i> | if the level of this M-gram is not such that $1 < M < N$ |
|------------------|----------------------------------------------------------|

Definition at line 175 of file generic\_trie\_base.hpp.

8.20.4.2 `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>  
void uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,  
BITMAP_HASH_CACHE_BUCKETS_FACTOR >::execute ( m_gram_query & query ) const [inline]`

This method allows to get the payloads and compute the (joint) m-gram probabilities.

Parameters

|                  |                                                                                                               |
|------------------|---------------------------------------------------------------------------------------------------------------|
| <i>min_level</i> | the minimum m-gram level to begin with                                                                        |
| <i>query</i>     | the query execution data for storing the query, and retrieved payloads, and resulting probabilities, and etc. |

Definition at line 240 of file generic\_trie\_base.hpp.

8.20.4.3    template<typename TrieType, typename WordIndexType, uint8\_t BITMAP\_HASH\_CACHE\_BUCKETS\_FACTOR>  
             void uva::smt::bpbd::server::lm::generic\_trie\_base< TrieType, WordIndexType,  
             BITMAP\_HASH\_CACHE\_BUCKETS\_FACTOR >::get\_m\_gram\_payload ( m\_gram\_query & *query*,  
             MGramStatusEnum & *status* ) const    [inline]

Allows to attempt the sub-m-gram payload retrieval for  $1 < m < n$

## Parameters

|               |                                            |
|---------------|--------------------------------------------|
| <i>query</i>  | the query containing the actual query data |
| <i>status</i> | the resulting status of the operation      |

Definition at line 313 of file generic\_trie\_base.hpp.

```
8.20.4.4 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
void uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::get_n_gram_payload (m_gram_query & query,
 MGramStatusEnum & status) const [inline]
```

Allows to attempt the sub-m-gram payload retrieval for m==n

## Parameters

|               |                                            |
|---------------|--------------------------------------------|
| <i>query</i>  | the query containing the actual query data |
| <i>status</i> | the resulting status of the operation      |

Definition at line 322 of file generic\_trie\_base.hpp.

```
8.20.4.5 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
void uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::get_unigram_payload (m_gram_query & query,
 MGramStatusEnum & status) const [inline]
```

Allows to attempt the sub-m-gram payload retrieval for m==1. The retrieval of a uni-gram data is always a success.

## Parameters

|               |                                            |
|---------------|--------------------------------------------|
| <i>query</i>  | the query containing the actual query data |
| <i>status</i> | the resulting status of the operation      |

Definition at line 304 of file generic\_trie\_base.hpp.

```
8.20.4.6 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
float uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::get_unk_word_prob () const [inline]
```

Allows to retrieve the unknown target word log probability penalty

## Returns

the target source word log probability penalty

Definition at line 142 of file generic\_trie\_base.hpp.

```
8.20.4.7 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
static constexpr bool uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::is_context_needed () [inline],[static]
```

Allows to indicate whether the context id of an m-gram is to be computed while retrieving payloads

## Returns

returns false, by default all generic tries need NO context ids when searching for data

Definition at line 150 of file generic\_trie\_base.hpp.

8.20.4.8    `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>  
void uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,  
BITMAP_HASH_CACHE_BUCKETS_FACTOR >::is_m_gram_potentially_present ( m_gram_query & query,  
MGramStatusEnum & status ) const    [inline]`

Allows to check if the given sub-m-gram, defined by the `begin_word_idx` and `end_word_idx` parameters, is potentially present in the trie. This method must not be called for uni-grams, those always have a payload!

## Parameters

|               |                                             |
|---------------|---------------------------------------------|
| <i>query</i>  | the m-gram query data                       |
| <i>status</i> | [out] the resulting status of the operation |

Definition at line 193 of file generic\_trie\_base.hpp.

```
8.20.4.9 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
 void uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::log_model_type_info () const [inline]
```

Allows to log the information about the instantiated trie type

Definition at line 182 of file generic\_trie\_base.hpp.

```
8.20.4.10 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
 void uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::pre_allocate (const size_t counts[LM_M_GRAM_LEVEL_MAX])
 [inline]
```

## See also

WordIndexTrieBase

Definition at line 157 of file generic\_trie\_base.hpp.

```
8.20.4.11 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
 void uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::register_m_gram_cache (const model_m_gram & gram)
 [inline]
```

Is to be used from the sub-classes from the add\_X\_gram methods. This method allows to register the given M-gram in internal high level caches if present.

WARNING: Is not to be used on uni-grams!!!

## Parameters

|             |                     |
|-------------|---------------------|
| <i>gram</i> | the M-gram to cache |
|-------------|---------------------|

Definition at line 335 of file generic\_trie\_base.hpp.

## 8.20.5 Member Data Documentation

```
8.20.5.1 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
 const TShortId uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::FIRST_VALID_CTX_ID = UNDEFINED_ARR_IDX + 1
 [static]
```

Definition at line 123 of file generic\_trie\_base.hpp.

```
8.20.5.2 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
 const phrase_length uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::MGRAM_IDX_OFFSET = 2 [static]
```

Definition at line 108 of file generic\_trie\_base.hpp.

```
8.20.5.3 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
const phrase_length uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
BITMAP_HASH_CACHE_BUCKETS_FACTOR >::N_GRAM_IDX_IN_M_N_ARR = LM_M_GRAM_LEVEL_MAX -
MGRAM_IDX_OFFSET [static]
```

Definition at line 117 of file generic\_trie\_base.hpp.

```
8.20.5.4 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR> const
bool uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType, BITMAP_HASH_CACH↵
E_BUCKETS_FACTOR >::NEEDS_BITMAP_HASH_CACHE = (BITMAP_HASH_CACHE_BUCKETS_FACTOR > 1)
[static]
```

Definition at line 105 of file generic\_trie\_base.hpp.

```
8.20.5.5 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
const phrase_length uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
BITMAP_HASH_CACHE_BUCKETS_FACTOR >::NUM_M_GRAM_LEVELS = LM_M_GRAM_LEVEL_MAX -
MGRAM_IDX_OFFSET [static]
```

Definition at line 111 of file generic\_trie\_base.hpp.

```
8.20.5.6 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
const phrase_length uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
BITMAP_HASH_CACHE_BUCKETS_FACTOR >::NUM_M_N_GRAM_LEVELS = LM_M_GRAM_LEVEL_MAX - 1
[static]
```

Definition at line 114 of file generic\_trie\_base.hpp.

```
8.20.5.7 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
const TShortId uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType,
BITMAP_HASH_CACHE_BUCKETS_FACTOR >::UNDEFINED_ARR_IDX = 0 [static]
```

Definition at line 120 of file generic\_trie\_base.hpp.

The documentation for this class was generated from the following file:

- [inc/server/lm/models/generic\\_trie\\_base.hpp](#)

## 8.21 uva::utils::containers::alloc::greedy\_memory\_allocator< T > Class Template Reference

```
#include <greedy_memory_allocator.hpp>
```

### Classes

- struct [rebind](#)

### Public Types

- typedef T [value\\_type](#)
- typedef [greedy\\_memory\\_storage::size\\_type](#) size\_type
- typedef std::ptrdiff\_t [difference\\_type](#)

- typedef T \* [pointer](#)
- typedef const T \* [const\\_pointer](#)
- typedef T & [reference](#)
- typedef const T & [const\\_reference](#)

## Public Member Functions

- [greedy\\_memory\\_allocator](#) ([size\\_type](#) numElems) throw ()
- [greedy\\_memory\\_allocator](#) (const [greedy\\_memory\\_allocator](#) &other) throw ()
- template<typename U >  
  [greedy\\_memory\\_allocator](#) (const [greedy\\_memory\\_allocator](#)< U > &other) throw ()
- virtual ~[greedy\\_memory\\_allocator](#) () throw ()
- [pointer](#) address ([reference](#) obj) const
- [const\\_pointer](#) address ([const\\_reference](#) obj) const
- [pointer](#) allocate ([size\\_type](#) num, [const\\_pointer](#) cp=0)
- void deallocate ([pointer](#) ptr, [size\\_type](#) num)
- [size\\_type](#) available () const throw ()
- [size\\_type](#) max\_size () const throw ()
- void construct ([pointer](#) ptr, const [value\\_type](#) &value)
- void destroy ([pointer](#) ptr)
- [greedy\\_memory\\_storage](#) & getStorageRef () const

## Protected Attributes

- [greedy\\_memory\\_storage](#) & [\\_manager](#)

### 8.21.1 Detailed Description

template<typename T>class uva::utils::containers::alloc::greedy\_memory\_allocator< T >

This is the fixed memory allocator class for using in the tries. Here we pre-allocate some fixed size memory and then just give it out when needed. Since the Trie is build once and then is not changed, we do no do any memory deallocation here!

Definition at line 133 of file greedy\_memory\_allocator.hpp.

### 8.21.2 Member Typedef Documentation

8.21.2.1 template<typename T> typedef const T\* uva::utils::containers::alloc::greedy\_memory\_allocator< T >::const\_pointer

Definition at line 139 of file greedy\_memory\_allocator.hpp.

8.21.2.2 template<typename T> typedef const T& uva::utils::containers::alloc::greedy\_memory\_allocator< T >::const\_reference

Definition at line 141 of file greedy\_memory\_allocator.hpp.

8.21.2.3 template<typename T> typedef std::ptrdiff\_t uva::utils::containers::alloc::greedy\_memory\_allocator< T >::difference\_type

Definition at line 137 of file greedy\_memory\_allocator.hpp.



8.21.2.4 `template<typename T> typedef T* uva::utils::containers::alloc::greedy_memory_allocator< T >::pointer`

Definition at line 138 of file `greedy_memory_allocator.hpp`.

8.21.2.5 `template<typename T> typedef T& uva::utils::containers::alloc::greedy_memory_allocator< T >::reference`

Definition at line 140 of file `greedy_memory_allocator.hpp`.

8.21.2.6 `template<typename T> typedef greedy_memory_storage::size_type uva::utils::containers::alloc::greedy_memory_allocator< T >::size_type`

Definition at line 136 of file `greedy_memory_allocator.hpp`.

8.21.2.7 `template<typename T> typedef T uva::utils::containers::alloc::greedy_memory_allocator< T >::value_type`

Definition at line 135 of file `greedy_memory_allocator.hpp`.

### 8.21.3 Constructor & Destructor Documentation

8.21.3.1 `template<typename T> uva::utils::containers::alloc::greedy_memory_allocator< T >::greedy_memory_allocator ( size_type numElems ) throw () [inline]`

The basic constructor.

Parameters

|                 |                                                                       |
|-----------------|-----------------------------------------------------------------------|
| <i>numElems</i> | the number of elements of template type T to pre-allocate memory for. |
|-----------------|-----------------------------------------------------------------------|

Definition at line 152 of file `greedy_memory_allocator.hpp`.

8.21.3.2 `template<typename T> uva::utils::containers::alloc::greedy_memory_allocator< T >::greedy_memory_allocator ( const greedy_memory_allocator< T > & other ) throw () [inline]`

The basic copy constructor.

Definition at line 163 of file `greedy_memory_allocator.hpp`.

8.21.3.3 `template<typename T> template<typename U> uva::utils::containers::alloc::greedy_memory_allocator< T >::greedy_memory_allocator ( const greedy_memory_allocator< U > & other ) throw () [inline]`

The basic re-bind constructor. It is used internally by the container in case it needs to allocate other sort data than the stored container elements.

Definition at line 174 of file `greedy_memory_allocator.hpp`.

8.21.3.4 `template<typename T> virtual uva::utils::containers::alloc::greedy_memory_allocator< T >::~greedy_memory_allocator ( ) throw () [inline], [virtual]`

The standard destructor

Definition at line 182 of file `greedy_memory_allocator.hpp`.

## 8.21.4 Member Function Documentation

**8.21.4.1** `template<typename T> pointer uva::utils::containers::alloc::greedy_memory_allocator< T >::address ( reference obj ) const` `[inline]`

Computes the address of the given object

Parameters

|            |                                      |
|------------|--------------------------------------|
| <i>obj</i> | the object to compute the pointer of |
|------------|--------------------------------------|

Returns

the computed pointer

Definition at line 192 of file greedy\_memory\_allocator.hpp.

**8.21.4.2** `template<typename T> const_pointer uva::utils::containers::alloc::greedy_memory_allocator< T >::address ( const_reference obj ) const` `[inline]`

Computes the address of the given object

Parameters

|            |                                      |
|------------|--------------------------------------|
| <i>obj</i> | the object to compute the pointer of |
|------------|--------------------------------------|

Returns

the computed pointer

Definition at line 202 of file greedy\_memory\_allocator.hpp.

**8.21.4.3** `template<typename T> pointer uva::utils::containers::alloc::greedy_memory_allocator< T >::allocate ( size_type num, const_pointer cp = 0 )` `[inline]`

Allocates memory for the given number of objects

Parameters

|            |                                   |
|------------|-----------------------------------|
| <i>num</i> | the number of objects to allocate |
| <i>cp</i>  | NOT USED                          |

Returns

the pointer to the first allocated object

Definition at line 213 of file greedy\_memory\_allocator.hpp.

**8.21.4.4** `template<typename T> size_type uva::utils::containers::alloc::greedy_memory_allocator< T >::available ( ) const throw` `[inline]`

Returns the available number of free elements we can store

Returns

the available number of free elements we can store

Definition at line 241 of file greedy\_memory\_allocator.hpp.

8.21.4.5 `template<typename T> void uva::utils::containers::alloc::greedy_memory_allocator< T >::construct ( pointer ptr, const value_type & value ) [inline]`

Calling the constructor on the given pointer

## Parameters

|              |                             |
|--------------|-----------------------------|
| <i>ptr</i>   | the pointer to work with    |
| <i>value</i> | the type value to work with |

Definition at line 258 of file greedy\_memory\_allocator.hpp.

**8.21.4.6** `template<typename T> void uva::utils::containers::alloc::greedy_memory_allocator< T >::deallocate ( pointer ptr, size_type num ) [inline]`

This function is supposed to deallocate the memory. We do not do that as this is fixed memory allocator

## Parameters

|            |                                     |
|------------|-------------------------------------|
| <i>ptr</i> | the pointer to free memory from     |
| <i>num</i> | the number of objects to deallocate |

Definition at line 232 of file greedy\_memory\_allocator.hpp.

**8.21.4.7** `template<typename T> void uva::utils::containers::alloc::greedy_memory_allocator< T >::destroy ( pointer ptr ) [inline]`

Calling the destructor on the given pointer

## Parameters

|            |                          |
|------------|--------------------------|
| <i>ptr</i> | the pointer to work with |
|------------|--------------------------|

Definition at line 267 of file greedy\_memory\_allocator.hpp.

**8.21.4.8** `template<typename T> greedy_memory_storage& uva::utils::containers::alloc::greedy_memory_allocator< T >::getStorageRef ( ) const [inline]`

Returns the reference to the buffer manager

## Returns

the reference to the buffer manager

Definition at line 276 of file greedy\_memory\_allocator.hpp.

**8.21.4.9** `template<typename T> size_type uva::utils::containers::alloc::greedy_memory_allocator< T >::max_size ( ) const throw ) [inline]`

Returns the maximum number of elements we can store

## Returns

the maximum number of elements we can store

Definition at line 249 of file greedy\_memory\_allocator.hpp.

## 8.21.5 Member Data Documentation

**8.21.5.1** `template<typename T> greedy_memory_storage& uva::utils::containers::alloc::greedy_memory_allocator< T >::_manager [protected]`

Definition at line 282 of file greedy\_memory\_allocator.hpp.

The documentation for this class was generated from the following file:

- [inc/common/utils/containers/greedy\\_memory\\_allocator.hpp](#)

## 8.22 uva::utils::containers::greedy\_memory\_storage Class Reference

```
#include <greedy_memory_storage.hpp>
```

### Public Types

- `typedef uint8_t TStorageData`
- `typedef std::size_t size_type`

### Public Member Functions

- `greedy_memory_storage ()`
- `greedy_memory_storage (size_type numBytes)`
- `greedy_memory_storage (const greedy_memory_storage &source)`
- `~greedy_memory_storage ()`
- `size_type getBufferSizeBytes () const`
- `size_type getAvailableBytes () const`
- `void * allocate (size_type num)`

### Protected Attributes

- `void * _pBuffer`
- `vector< void * > _memoryBuffers`
- `size_type _numBytes`
- `size_type _allocBytes`

#### 8.22.1 Detailed Description

This is the greedy memory storage class that in the first place allocates some storage and then only grows it if more space is needed!

Definition at line 49 of file `greedy_memory_storage.hpp`.

#### 8.22.2 Member Typedef Documentation

##### 8.22.2.1 `typedef std::size_t uva::utils::containers::greedy_memory_storage::size_type`

Definition at line 56 of file `greedy_memory_storage.hpp`.

##### 8.22.2.2 `typedef uint8_t uva::utils::containers::greedy_memory_storage::TStorageData`

Definition at line 53 of file `greedy_memory_storage.hpp`.

### 8.22.3 Constructor & Destructor Documentation

**8.22.3.1** `uva::utils::containers::greedy_memory_storage::greedy_memory_storage ( ) [inline], [explicit]`

The basic constructor

Definition at line 61 of file `greedy_memory_storage.hpp`.

**8.22.3.2** `uva::utils::containers::greedy_memory_storage::greedy_memory_storage ( size_type numBytes ) [inline], [explicit]`

The basic constructor of the greedy storage.

Parameters

|                 |                                                                                  |
|-----------------|----------------------------------------------------------------------------------|
| <i>numBytes</i> | the number of bytes to pre-allocate the buffer for - the initial buffer capacity |
|-----------------|----------------------------------------------------------------------------------|

Definition at line 68 of file `greedy_memory_storage.hpp`.

**8.22.3.3** `uva::utils::containers::greedy_memory_storage::greedy_memory_storage ( const greedy_memory_storage & source ) [inline]`

The copy constructor

Definition at line 85 of file `greedy_memory_storage.hpp`.

**8.22.3.4** `uva::utils::containers::greedy_memory_storage::~~greedy_memory_storage ( ) [inline]`

The basic destructor.

Definition at line 95 of file `greedy_memory_storage.hpp`.

### 8.22.4 Member Function Documentation

**8.22.4.1** `void* uva::utils::containers::greedy_memory_storage::allocate ( size_type num ) [inline]`

Allocates the memory of required size, if there is not enough space in the buffer, then reallocates!

Parameters

|            |                                               |
|------------|-----------------------------------------------|
| <i>num</i> | the number of bytes to allocate in the buffer |
|------------|-----------------------------------------------|

Returns

the pointer to the beginning of the allocated memory block

Definition at line 123 of file `greedy_memory_storage.hpp`.

**8.22.4.2** `size_type uva::utils::containers::greedy_memory_storage::getAvailableBytes ( ) const [inline]`

Returns the number of free bytes remaining

Returns

the number of free bytes remaining

Definition at line 114 of file `greedy_memory_storage.hpp`.

#### 8.22.4.3 size\_type uva::utils::containers::greedy\_memory\_storage::getBufferSizeBytes ( ) const [inline]

Returns the current buffer size

Returns

the current buffer size

Definition at line 106 of file greedy\_memory\_storage.hpp.

### 8.22.5 Member Data Documentation

#### 8.22.5.1 size\_type uva::utils::containers::greedy\_memory\_storage::\_allocBytes [protected]

Definition at line 152 of file greedy\_memory\_storage.hpp.

#### 8.22.5.2 vector<void\*> uva::utils::containers::greedy\_memory\_storage::\_memoryBuffers [protected]

Definition at line 146 of file greedy\_memory\_storage.hpp.

#### 8.22.5.3 size\_type uva::utils::containers::greedy\_memory\_storage::\_numBytes [protected]

Definition at line 149 of file greedy\_memory\_storage.hpp.

#### 8.22.5.4 void\* uva::utils::containers::greedy\_memory\_storage::\_pBuffer [protected]

Definition at line 143 of file greedy\_memory\_storage.hpp.

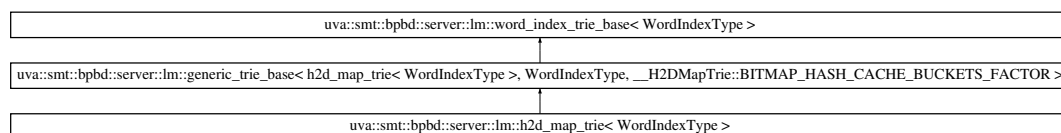
The documentation for this class was generated from the following file:

- [inc/common/utis/containers/greedy\\_memory\\_storage.hpp](#)

## 8.23 uva::smt::bpbd::server::lm::h2d\_map\_trie< WordIndexType > Class Template Reference

```
#include <h2d_map_trie.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::lm::h2d\_map\_trie< WordIndexType >:



### Public Types

- typedef [generic\\_trie\\_base< h2d\\_map\\_trie< WordIndexType >, WordIndexType, \\_\\_H2DMapTrie::BITMAP\\_HASH\\_CACHE\\_BUCKETS\\_FACTOR >](#) [BASE](#)
- typedef [\\_\\_H2DMapTrie::S\\_M\\_GramData< m\\_gram\\_payload >](#) [T\\_M\\_Gram\\_PB\\_Entry](#)
- typedef [\\_\\_H2DMapTrie::S\\_M\\_GramData< prob\\_weight >](#) [T\\_M\\_Gram\\_Prob\\_Entry](#)

## Public Member Functions

- [h2d\\_map\\_trie](#) ([WordIndexType](#) &word\_index)
- float [get\\_unk\\_word\\_prob](#) () const
- void [log\\_model\\_type\\_info](#) () const
- void [set\\_def\\_unk\\_word\\_prob](#) (const [prob\\_weight](#) prob)
- virtual void [pre\\_allocate](#) (const size\_t counts[LM\_M\_GRAM\_LEVEL\_MAX])
- template<phrase\_length CURR\_LEVEL>  
void [add\\_m\\_gram](#) (const [model\\_m\\_gram](#) &gram)
- void [get\\_unigram\\_payload](#) ([m\\_gram\\_query](#) &query) const
- void [get\\_m\\_gram\\_payload](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const
- void [get\\_n\\_gram\\_payload](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const
- virtual [~h2d\\_map\\_trie](#) ()

## Additional Inherited Members

### 8.23.1 Detailed Description

template<typename WordIndexType>class uva::smt::bpbd::server::lm::h2d\_map\_trie< WordIndexType >

This is a Gram to Data trie that is implemented as a HashMap.

#### Parameters

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| <i>M_GRAM_LEVEL_MAX</i> | - the maximum level of the considered N-gram, i.e. the N value |
|-------------------------|----------------------------------------------------------------|

Definition at line 113 of file h2d\_map\_trie.hpp.

### 8.23.2 Member Typedef Documentation

8.23.2.1 template<typename WordIndexType> typedef generic\_trie\_base<h2d\_map\_trie<WordIndexType>, WordIndexType, \_\_H2DMapTrie::BITMAP\_HASH\_CACHE\_BUCKETS\_FACTOR> uva::smt::bpbd::server::lm::h2d\_map\_trie< WordIndexType >::BASE

Definition at line 115 of file h2d\_map\_trie.hpp.

8.23.2.2 template<typename WordIndexType> typedef \_\_H2DMapTrie::S\_M\_GramData<m\_gram\_payload> uva::smt::bpbd::server::lm::h2d\_map\_trie< WordIndexType >::T\_M\_Gram\_PB\_Entry

Definition at line 116 of file h2d\_map\_trie.hpp.

8.23.2.3 template<typename WordIndexType> typedef \_\_H2DMapTrie::S\_M\_GramData<prob\_weight> uva::smt::bpbd::server::lm::h2d\_map\_trie< WordIndexType >::T\_M\_Gram\_Prob\_Entry

Definition at line 117 of file h2d\_map\_trie.hpp.

### 8.23.3 Constructor & Destructor Documentation

8.23.3.1 template<typename WordIndexType> uva::smt::bpbd::server::lm::h2d\_map\_trie< WordIndexType >::h2d\_map\_trie ( WordIndexType & word\_index ) [explicit]

The basic constructor



## Parameters

|                         |                           |
|-------------------------|---------------------------|
| <code>_wordIndex</code> | the word index to be used |
|-------------------------|---------------------------|

Definition at line 48 of file h2d\_map\_trie.cpp.

**8.23.3.2** `template<typename WordIndexType > uva::smt::bpbd::server::lm::h2d_map_trie< WordIndexType >::~h2d_map_trie( ) [virtual]`

The basic class destructor

Definition at line 88 of file h2d\_map\_trie.cpp.

**8.23.4 Member Function Documentation**

**8.23.4.1** `template<typename WordIndexType> template<phrase_length CURR_LEVEL> void uva::smt::bpbd::server::lm::h2d_map_trie< WordIndexType >::add_m_gram ( const model_m_gram & gram ) [inline]`

This method adds a M-Gram (word) to the trie where  $1 < M < N$

See also

GenericTrieBase

Definition at line 159 of file h2d\_map\_trie.hpp.

**8.23.4.2** `template<typename WordIndexType> void uva::smt::bpbd::server::lm::h2d_map_trie< WordIndexType >::get_m_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for  $1 < m < n$

See also

GenericTrieBase

## Parameters

|                     |                                            |
|---------------------|--------------------------------------------|
| <code>query</code>  | the query containing the actual query data |
| <code>status</code> | the resulting status of the operation      |

Definition at line 217 of file h2d\_map\_trie.hpp.

**8.23.4.3** `template<typename WordIndexType> void uva::smt::bpbd::server::lm::h2d_map_trie< WordIndexType >::get_n_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for  $m == n$

See also

GenericTrieBase

## Parameters

|               |                                            |
|---------------|--------------------------------------------|
| <i>query</i>  | the query containing the actual query data |
| <i>status</i> | the resulting status of the operation      |

Definition at line 235 of file h2d\_map\_trie.hpp.

**8.23.4.4** `template<typename WordIndexType> void uva::smt::bpbd::server::lm::h2d_map_trie< WordIndexType >::get_unigram_payload ( m_gram_query & query ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for m==1. The retrieval of a uni-gram data is always a success.

See also

GenericTrieBase

Definition at line 201 of file h2d\_map\_trie.hpp.

**8.23.4.5** `template<typename WordIndexType> float uva::smt::bpbd::server::lm::h2d_map_trie< WordIndexType >::get_unk_word_prob ( ) const [inline]`

Allows to retrieve the unknown target word log probability penalty

Returns

the target source word log probability penalty

Definition at line 129 of file h2d\_map\_trie.hpp.

**8.23.4.6** `template<typename WordIndexType> void uva::smt::bpbd::server::lm::h2d_map_trie< WordIndexType >::log_model_type_info ( ) const [inline]`

Allows to log the information about the instantiated trie type

Definition at line 136 of file h2d\_map\_trie.hpp.

**8.23.4.7** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::h2d_map_trie< WordIndexType >::pre_allocate ( const size_t counts[LM_M_GRAM_LEVEL_MAX] ) [virtual]`

This method can be used to provide the N-gram count information That should allow for pre-allocation of the memory

See also

GenericTrieBase

Definition at line 67 of file h2d\_map\_trie.cpp.

**8.23.4.8** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::h2d_map_trie< WordIndexType >::set_def_unk_word_prob ( const prob_weight prob )`

See also

[word\\_index\\_trie\\_base](#)

Definition at line 81 of file h2d\_map\_trie.cpp.

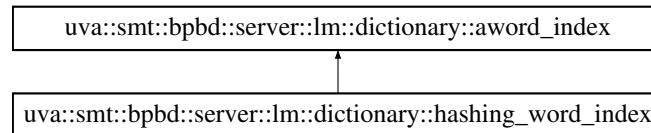
The documentation for this class was generated from the following files:

- [inc/server/lm/models/h2d\\_map\\_trie.hpp](#)
- [src/server/lm/models/h2d\\_map\\_trie.cpp](#)

## 8.24 uva::smt::bpbd::server::lm::dictionary::hashing\_word\_index Class Reference

```
#include <hashing_word_index.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::lm::dictionary::hashing\_word\_index:



### Public Member Functions

- [hashing\\_word\\_index](#) (const float memory\_factor)
- void [reserve](#) (const size\_t num\_words)
- size\_t [get\\_number\\_of\\_words](#) (const size\_t num\_words) const
- [word\\_uid](#) [get\\_word\\_id](#) (const [text\\_piece\\_reader](#) &token) const
- bool [is\\_word\\_registering\\_needed](#) () const
- [word\\_uid](#) [register\\_word](#) (const [text\\_piece\\_reader](#) &token)
- bool [is\\_word\\_counts\\_needed](#) () const
- bool [is\\_post\\_actions\\_needed](#) () const
- virtual [~hashing\\_word\\_index](#) ()

### Static Public Member Functions

- static constexpr bool [is\\_word\\_index\\_continuous](#) ()

#### 8.24.1 Detailed Description

This is a hashing word index, it is trivial - each word gets an id which is its hash value. This also means that any word is considered to be a known word. Therefore, in the Tries if the word id has no associated payload then an unknown word payload is to be used. Still the unknown and undefined word ids are reserved and should not be issued.

Definition at line 58 of file `hashing_word_index.hpp`.

#### 8.24.2 Constructor & Destructor Documentation

8.24.2.1 `uva::smt::bpbd::server::lm::dictionary::hashing_word_index ( const float memory_factor )`  
`[inline]`

The basic constructor

Parameters

|                      |                                                    |
|----------------------|----------------------------------------------------|
| <i>memory_factor</i> | is not used, is here only for interface compliancy |
|----------------------|----------------------------------------------------|

Definition at line 65 of file `hashing_word_index.hpp`.

8.24.2.2 `virtual uva::smt::bpbd::server::lm::dictionary::hashing_word_index::~hashing_word_index ( )` `[inline]`,  
`[virtual]`

The basic destructor

Definition at line 140 of file `hashing_word_index.hpp`.

### 8.24.3 Member Function Documentation

**8.24.3.1** `size_t uva::smt::bpbd::server::lm::dictionary::hashing_word_index::get_number_of_words ( const size_t num_words ) const [inline]`

See also

[AWordIndex](#)

Definition at line 80 of file `hashing_word_index.hpp`.

**8.24.3.2** `word_uid uva::smt::bpbd::server::lm::dictionary::hashing_word_index::get_word_id ( const text_piece_reader & token ) const [inline]`

Does not detect unknown words. The returned word id is  $\geq$  MIN\_KNOWN\_WORD\_ID

See also

[AWordIndex](#)

Definition at line 89 of file `hashing_word_index.hpp`.

**8.24.3.3** `bool uva::smt::bpbd::server::lm::dictionary::hashing_word_index::is_post_actions_needed ( ) const [inline]`

See also

[AWordIndex](#)

Definition at line 125 of file `hashing_word_index.hpp`.

**8.24.3.4** `bool uva::smt::bpbd::server::lm::dictionary::hashing_word_index::is_word_counts_needed ( ) const [inline]`

See also

[AWordIndex](#)

Definition at line 118 of file `hashing_word_index.hpp`.

**8.24.3.5** `static constexpr bool uva::smt::bpbd::server::lm::dictionary::hashing_word_index::is_word_index_continuous ( ) [inline], [static]`

See also

[AWordIndex](#)

Returns

false - this word index is not continuous.

Definition at line 133 of file `hashing_word_index.hpp`.

**8.24.3.6** `bool uva::smt::bpbd::server::lm::dictionary::hashing_word_index::is_word_registering_needed ( ) const [inline]`

The returned word id is  $\geq$  MIN\_KNOWN\_WORD\_ID

See also

`AWordIndex`

Definition at line 103 of file `hashing_word_index.hpp`.

**8.24.3.7** `word_uid` `uva::smt::bpbd::server::lm::dictionary::hashing_word_index::register_word ( const text_piece_reader & token ) [inline]`

The word registration is not needed, for this word index.

See also

`AWordIndex`

Definition at line 111 of file `hashing_word_index.hpp`.

**8.24.3.8** `void` `uva::smt::bpbd::server::lm::dictionary::hashing_word_index::reserve ( const size_t num_words ) [inline]`

See also

`AWordIndex`

Definition at line 73 of file `hashing_word_index.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/lm/dictionaries/`[hashing\\_word\\_index.hpp](#)

## 8.25 `uva::smt::bpbd::common::messaging::id_manager< id_type >` Class Template Reference

```
#include <id_manager.hpp>
```

### Public Types

- `typedef websocketpp::lib::lock_guard< websocketpp::lib::mutex >` [scoped\\_lock](#)

### Public Member Functions

- [id\\_manager](#) (const `id_type` min\_id)
- `uint32_t` [get\\_next\\_id](#) ()
- `const id_type &` [get\\_min\\_id](#) () const

### 8.25.1 Detailed Description

```
template<typename id_type>class uva::smt::bpbd::common::messaging::id_manager< id_type >
```

This class is synchronized and an instance of the class is to be used in case one needs continuous ids to be issued in a multi-threaded environment.

Definition at line 43 of file `id_manager.hpp`.

## 8.25.2 Member Typedef Documentation

8.25.2.1 `template<typename id_type> typedef websocketpp::lib::lock_guard<websocketpp::lib::mutex> uva::smt::bpbdd::common::messaging::id_manager< id_type >::scoped_lock`

Definition at line 45 of file `id_manager.hpp`.

## 8.25.3 Constructor & Destructor Documentation

8.25.3.1 `template<typename id_type> uva::smt::bpbdd::common::messaging::id_manager< id_type >::id_manager ( const id_type min_id ) [inline]`

The basic class constructor for the id issuing entity. It is recommended to have the minimum value for the id higher than that allowed by the type itself. This way one can check for overflows.

Parameters

|               |                         |
|---------------|-------------------------|
| <i>min_id</i> | the minimum value of id |
|---------------|-------------------------|

Definition at line 54 of file `id_manager.hpp`.

## 8.25.4 Member Function Documentation

8.25.4.1 `template<typename id_type> const id_type& uva::smt::bpbdd::common::messaging::id_manager< id_type >::get_min_id ( ) const [inline]`

Allows to get the minimum value of the issued ids

Returns

the minimum value of the issued ids.

Definition at line 72 of file `id_manager.hpp`.

8.25.4.2 `template<typename id_type> uint32_t uva::smt::bpbdd::common::messaging::id_manager< id_type >::get_next_id ( ) [inline]`

Allows to get the next id. This method is thread safe due to mutex locking.

Returns

the next id

Definition at line 62 of file `id_manager.hpp`.

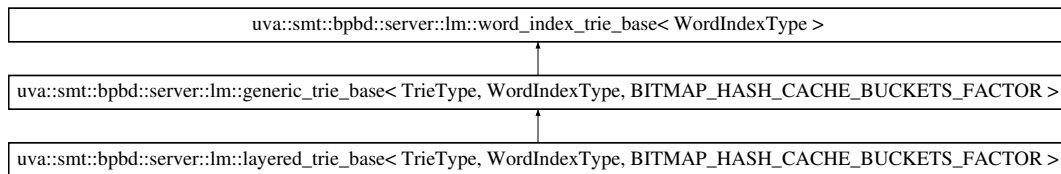
The documentation for this class was generated from the following file:

- [inc/common/messaging/id\\_manager.hpp](#)

## 8.26 `uva::smt::bpbdd::server::lm::layered_trie_base< TrieType, WordIndexType, BITMAP_HAS_P_HASH_CACHE_BUCKETS_FACTOR >` Class Template Reference

```
#include <layered_trie_base.hpp>
```

Inheritance diagram for `uva::smt::bpbdd::server::lm::layered_trie_base< TrieType, WordIndexType, BITMAP_HAS_P_HASH_CACHE_BUCKETS_FACTOR >`:



## Public Types

- typedef [generic\\_trie\\_base](#)< TrieType, [WordIndexType](#), BITMAP\_HASH\_CACHE\_BUCKETS\_FACTOR > [BASE](#)

## Public Member Functions

- [layered\\_trie\\_base](#) ([WordIndexType](#) &word\_index)
- void [pre\\_allocate](#) (const size\_t counts[LM\_M\_GRAM\_LEVEL\_MAX])
- bool [get\\_ctx\\_id](#) (const [phrase\\_length](#) level\_idx, const [TShortId](#) word\_id, [TLongId](#) &ctx\_id) const
- template<phrase\_length CURR\_LEVEL>  
bool [get\\_cached\\_context\\_id](#) (const [model\\_m\\_gram](#) &gram, [TLongId](#) &result) const
- template<phrase\_length CURR\_LEVEL>  
void [set\\_cache\\_context\\_id](#) (const [model\\_m\\_gram](#) &gram, [TLongId](#) &ctx\_id)

## Static Public Member Functions

- static constexpr bool [is\\_context\\_needed](#) ()

## Protected Member Functions

- void [ensure\\_context](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const

## Additional Inherited Members

### 8.26.1 Detailed Description

```
template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>class uva::smt::bpbd::server::lm::layered_trie_base< TrieType, WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR >
```

This class defined the trie interface and functionality that is expected by the TrieDriver class

Definition at line 153 of file layered\_trie\_base.hpp.

### 8.26.2 Member Typedef Documentation

- 8.26.2.1 `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR> typedef generic\_trie\_base<TrieType, WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR> uva::smt::bpbd::server::lm::layered_trie_base< TrieType, WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR >::BASE`

Definition at line 156 of file layered\_trie\_base.hpp.

### 8.26.3 Constructor & Destructor Documentation

8.26.3.1 `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>  
uva::smt::bpbd::server::lm::layered_trie_base< TrieType, WordIndexType, BITMAP_HASH_C↵  
ACHE_BUCKETS_FACTOR >::layered_trie_base ( WordIndexType & word_index ) [inline],  
[explicit]`

The basic constructor



## Parameters

|                   |                           |
|-------------------|---------------------------|
| <i>word_index</i> | the word index to be used |
|-------------------|---------------------------|

Definition at line 162 of file layered\_trie\_base.hpp.

## 8.26.4 Member Function Documentation

**8.26.4.1** `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>  
void uva::smt::bpbd::server::lm::layered_trie_base< TrieType, WordIndexType,  
BITMAP_HASH_CACHE_BUCKETS_FACTOR >::ensure_context ( m_gram_query & query, MGramStatusEnum  
& status ) const [inline], [protected]`

For the given query tries to ensure that the context is computed and stored. Also for the context the payload is retrieved. If the back-off is also not found sets its payload pointer to the zero payload structure. WARNING: This method is to be only called for minimal bi-gram queries! WARNING: Is only to be called if the context has not been computed yet

## Parameters

|              |                        |
|--------------|------------------------|
| <i>query</i> | the query to work with |
|--------------|------------------------|

## Returns

true if the context was successfully computed, otherwise false.

Definition at line 241 of file layered\_trie\_base.hpp.

**8.26.4.2** `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>  
template<phrase_length CURR_LEVEL> bool uva::smt::bpbd::server::lm::layered_trie_base<  
TrieType, WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR >::get_cached_context_id ( const  
model_m_gram & gram, TLongId & result ) const [inline]`

Allows to retrieve the cached context id for the given M-gram if any

## Parameters

|               |                                                        |
|---------------|--------------------------------------------------------|
| <i>mGram</i>  | the m-gram to get the context id for                   |
| <i>result</i> | the output parameter, will store the cached id, if any |

## Returns

true if there was nothing cached, otherwise false

Definition at line 202 of file layered\_trie\_base.hpp.

**8.26.4.3** `template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>  
bool uva::smt::bpbd::server::lm::layered_trie_base< TrieType, WordIndexType,  
BITMAP_HASH_CACHE_BUCKETS_FACTOR >::get_ctx_id ( const phrase_length level_idx, const TShortId  
word_id, TLongId & ctx_id ) const [inline]`

Allows to get the the new context id for the word and previous context id given the level

## Parameters

|                  |                                                                        |
|------------------|------------------------------------------------------------------------|
| <i>level_idx</i> | the m-gram level index, where m is > 1 and index is computed as m - 2; |
| <i>word_id</i>   | the word id on this level                                              |
| <i>ctx_id</i>    | the previous level context id                                          |

**Returns**

true if computation of the next context is succeeded

Definition at line 191 of file layered\_trie\_base.hpp.

```
8.26.4.4 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
 static constexpr bool uva::smt::bpbd::server::lm::layered_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::is_context_needed() [inline], [static]
```

Allows to indicate whether the context id of an m-gram is to be computed while retrieving payloads

**Returns**

returns true, by default all layered tries need context ids when searching for data

Definition at line 173 of file layered\_trie\_base.hpp.

```
8.26.4.5 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
 void uva::smt::bpbd::server::lm::layered_trie_base< TrieType, WordIndexType,
 BITMAP_HASH_CACHE_BUCKETS_FACTOR >::pre_allocate (const size_t counts[LM_M_GRAM_LEVEL_MAX])
 [inline]
```

**See also**

GenericTrieBase

Definition at line 180 of file layered\_trie\_base.hpp.

```
8.26.4.6 template<typename TrieType, typename WordIndexType, uint8_t BITMAP_HASH_CACHE_BUCKETS_FACTOR>
 template<phrase_length CURR_LEVEL> void uva::smt::bpbd::server::lm::layered_trie_base< TrieType,
 WordIndexType, BITMAP_HASH_CACHE_BUCKETS_FACTOR >::set_cache_context_id (const model_m_gram
 & gram, TLongId & ctx_id) [inline]
```

Allows to cache the context id of the given m-grams context

**Parameters**

|               |                                 |
|---------------|---------------------------------|
| <i>gram</i>   | the m-gram to cache             |
| <i>ctx_id</i> | the m-gram context id to cache. |

Definition at line 221 of file layered\_trie\_base.hpp.

The documentation for this class was generated from the following file:

- [inc/server/lm/models/layered\\_trie\\_base.hpp](#)

## 8.27 uva::smt::bpbd::server::lm::arpa::lm\_basic\_builder< trie\_type, reader\_type > Class Template Reference

```
#include <lm_basic_builder.hpp>
```

## Public Types

- typedef trie\_type::WordIndexType [WordIndexType](#)

## Public Member Functions

- [lm\\_basic\\_builder](#) (const [lm\\_parameters](#) &params, trie\_type &trie, reader\_type &file)
- void [build](#) ()
- virtual [~lm\\_basic\\_builder](#) ()

### 8.27.1 Detailed Description

template<typename trie\_type, typename reader\_type>class uva::smt::bpbd::server::lm::arpa::lm\_basic\_builder< trie\_type, reader\_type >

This is the Trie builder class that reads an input file stream and creates n-grams and then records them into the provided Trie. This is an ARPA format based trie builder, so it expects that the provided model file contains a basic text model in ARPA format.

Definition at line 60 of file lm\_basic\_builder.hpp.

### 8.27.2 Member Typedef Documentation

8.27.2.1 template<typename trie\_type, typename reader\_type> typedef trie\_type::WordIndexType  
uva::smt::bpbd::server::lm::arpa::lm\_basic\_builder< trie\_type, reader\_type >::WordIndexType

Definition at line 62 of file lm\_basic\_builder.hpp.

### 8.27.3 Constructor & Destructor Documentation

8.27.3.1 template<typename trie\_type, typename reader\_type> uva::smt::bpbd::server::lm::arpa::lm\_basic\_builder< trie\_type, reader\_type >::lm\_basic\_builder ( const lm\_parameters & params, trie\_type & trie, reader\_type & file )

The basic constructor that accepts a trie to be build up and the file stream to read from params the model parameters

Parameters

|              |                                                    |
|--------------|----------------------------------------------------|
| <i>trie</i>  | the trie to fill in with data from the text corpus |
| <i>_fstr</i> | the file stream to read from                       |

8.27.3.2 template<typename trie\_type , typename reader\_type > uva::smt::bpbd::server::lm::arpa::lm\_basic\_builder< trie\_type, reader\_type >::~~lm\_basic\_builder ( )  
[virtual]

Definition at line 68 of file lm\_basic\_builder.cpp.

### 8.27.4 Member Function Documentation

8.27.4.1 template<typename TrieType , typename TFileReaderModel > void uva::smt::bpbd::server::lm::arpa::lm\_basic\_builder< TrieType, TFileReaderModel >::build ( )

This function will read from the file and build the trie

Definition at line 455 of file `lm_basic_builder.cpp`.

The documentation for this class was generated from the following files:

- `inc/server/lm/builders/lm_basic_builder.hpp`
- `src/server/lm/builders/lm_basic_builder.cpp`

## 8.28 uva::smt::bpbd::server::lm::lm\_configurator Class Reference

```
#include <lm_configurator.hpp>
```

### Static Public Member Functions

- static void `connect` (const `lm_parameters` &params)
- static void `disconnect` ()
- static `lm_slow_query_proxy` & `allocate_slow_query_proxy` ()
- static void `dispose_slow_query_proxy` (`lm_slow_query_proxy` &query)
- static `lm_fast_query_proxy` & `allocate_fast_query_proxy` ()
- static void `dispose_fast_query_proxy` (`lm_fast_query_proxy` &query)

### 8.28.1 Detailed Description

This class represents a singleton that allows to configure the language model and then issues. query proxy objects for performing the queries against the internally encapsulated language model(s).

Definition at line 55 of file `lm_configurator.hpp`.

### 8.28.2 Member Function Documentation

**8.28.2.1** `static lm_fast_query_proxy& uva::smt::bpbd::server::lm::lm_configurator::allocate_fast_query_proxy ( )`  
`[inline], [static]`

Allows to return an instance of the query executor, is to be returned by calling the dispose method.

#### Returns

an instance of the query executor.

Definition at line 114 of file `lm_configurator.hpp`.

**8.28.2.2** `static lm_slow_query_proxy& uva::smt::bpbd::server::lm::lm_configurator::allocate_slow_query_proxy ( )`  
`[inline], [static]`

Allows to return an instance of the query executor, is to be returned by calling the dispose method.

#### Returns

an instance of the query executor.

Definition at line 94 of file `lm_configurator.hpp`.

**8.28.2.3** `static void uva::smt::bpbd::server::lm::lm_configurator::connect ( const lm_parameters & params )`  
`[inline], [static]`

This method allows to set the configuration parameters for the word index trie etc. This method is to be called only once! The latter is not checked but is a must.

## Parameters

|               |                                                                                                 |
|---------------|-------------------------------------------------------------------------------------------------|
| <i>params</i> | the language model parameters to be set, this class only stores the referent to the parameters. |
|---------------|-------------------------------------------------------------------------------------------------|

Definition at line 65 of file lm\_configurator.hpp.

#### 8.28.2.4 static void uva::smt::bpbd::server::lm::lm\_configurator::disconnect ( ) [inline],[static]

Allows to disconnect from the language model.

Definition at line 79 of file lm\_configurator.hpp.

#### 8.28.2.5 static void uva::smt::bpbd::server::lm::lm\_configurator::dispose\_fast\_query\_proxy ( lm\_fast\_query\_proxy & query ) [inline],[static]

Dispose the previously allocated query object

## Parameters

|              |                      |
|--------------|----------------------|
| <i>query</i> | the query to dispose |
|--------------|----------------------|

Definition at line 125 of file lm\_configurator.hpp.

#### 8.28.2.6 static void uva::smt::bpbd::server::lm::lm\_configurator::dispose\_slow\_query\_proxy ( lm\_slow\_query\_proxy & query ) [inline],[static]

Dispose the previously allocated query object

## Parameters

|              |                      |
|--------------|----------------------|
| <i>query</i> | the query to dispose |
|--------------|----------------------|

Definition at line 105 of file lm\_configurator.hpp.

The documentation for this class was generated from the following files:

- [inc/server/lm/lm\\_configurator.hpp](#)
- [src/server/lm/lm\\_configurator.cpp](#)

## 8.29 uva::smt::bpbd::server::lm::\_\_executor::lm\_exec\_params Struct Reference

```
#include <lm_executor.hpp>
```

## Public Attributes

- [lm\\_parameters m\\_lm\\_params](#)
- [string m\\_query\\_file\\_name](#)

### 8.29.1 Detailed Description

This structure is needed to store the language model (query application) parameters

Definition at line 72 of file lm\_executor.hpp.

## 8.29.2 Member Data Documentation

### 8.29.2.1 `lm_parameters` `uva::smt::bpbd::server::lm::__executor::lm_exec_params::m_lm_params`

Definition at line 74 of file `lm_executor.hpp`.

### 8.29.2.2 `string` `uva::smt::bpbd::server::lm::__executor::lm_exec_params::m_query_file_name`

Definition at line 77 of file `lm_executor.hpp`.

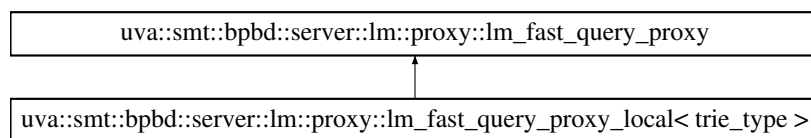
The documentation for this struct was generated from the following file:

- [inc/server/lm/lm\\_executor.hpp](#)

## 8.30 `uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy` Class Reference

```
#include <lm_fast_query_proxy.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy`:



## Public Member Functions

- virtual `~lm_fast_query_proxy` ()
- virtual `prob_weight` `get_unk_word_prob` () const =0
- virtual const `word_uid` & `get_begin_tag_uid` () const =0
- virtual const `word_uid` & `get_end_tag_uid` () const =0
- virtual void `get_word_ids` (`text_piece_reader` phrase, `phrase_length` &num\_words, `word_uid` word\_ids[tm::← TM\_MAX\_TARGET\_PHRASE\_LEN]) const =0
- virtual `prob_weight` `execute` (const `phrase_length` num\_words, const `word_uid` \*word\_ids)=0
- virtual `prob_weight` `execute` (const `phrase_length` num\_words, const `word_uid` \*word\_ids, `phrase_length` &min\_level)=0

### 8.30.1 Detailed Description

This class represents a trie query proxy interface class. It allows to interact with templated trie queries in a uniform way.

Definition at line 48 of file `lm_fast_query_proxy.hpp`.

### 8.30.2 Constructor & Destructor Documentation

#### 8.30.2.1 virtual `uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy::~lm_fast_query_proxy` ( ) [inline], [virtual]

The basic virtual destructor

Definition at line 54 of file `lm_fast_query_proxy.hpp`.

### 8.30.3 Member Function Documentation

#### 8.30.3.1 virtual prob\_weight uva::smt::bpbd::server::lm::proxy::lm\_fast\_query\_proxy::execute ( const phrase\_length num\_words, const word\_uid \* word\_ids ) [pure virtual]

Allows to execute m-gram the query. The query starts with the m-gram size one (1) and then grows until the maximum of LM\_M\_GRAM\_LEVEL\_MAX. After that m-grams of the LM\_M\_GRAM\_LEVEL\_MAX are computed via a sliding window: Let: "LM\_MAX\_QUERY\_LEN = 4", "num\_word\_ids == 6" and "word\_ids == w1w2w3w4w5w6" Then this method will compute the sum:  $P(w_1) + P(w_2|w_1) + P(w_3|w_1w_2) + P(w_4|w_1w_2w_3) + P(w_5|w_2w_3w_4) + P(w_6|w_3w_4w_5)$

##### Parameters

|                  |                                                                                       |
|------------------|---------------------------------------------------------------------------------------|
| <i>num_words</i> | stores the number of word ids, the maximum number of words must be LM_MAX_QUERY_LEN   |
| <i>word_ids</i>  | the word identifiers of the words of the target phrase to compute the probability for |

##### Returns

the probability weight for the given query

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy\\_local< trie\\_type >](#).

#### 8.30.3.2 virtual prob\_weight uva::smt::bpbd::server::lm::proxy::lm\_fast\_query\_proxy::execute ( const phrase\_length num\_words, const word\_uid \* word\_ids, phrase\_length & min\_level ) [pure virtual]

Allows to execute m-gram the query. The query starts with the m-gram size given by min\_level and then grows until the maximum of LM\_M\_GRAM\_LEVEL\_MAX. After that m-grams of the LM\_M\_GRAM\_LEVEL\_MAX are computed via a sliding window: Let: "min\_level == 2", "LM\_MAX\_QUERY\_LEN = 4", "num\_word\_ids == 6" and "word\_ids == w1w2w3w4w5w6" Then this method will compute the sum:  $P(w_2|w_1) + P(w_3|w_1w_2) + P(w_4|w_1w_2w_3) + P(w_5|w_2w_3w_4) + P(w_6|w_3w_4w_5)$

##### Parameters

|    |                  |                                                                                                                            |
|----|------------------|----------------------------------------------------------------------------------------------------------------------------|
| in | <i>num_words</i> | stores the number of word ids, the maximum number of words must be LM_MAX_QUERY_LEN                                        |
| in | <i>word_ids</i>  | the word identifiers of the words of the target phrase to compute the probability for                                      |
|    | <i>[in/out]</i>  | min_level the first m-gram level to consider, the next minimum m-gram level to consider, is limited by LM_M_GRAM_LEVEL_MAX |

##### Returns

the resulting probability weight

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy\\_local< trie\\_type >](#).

#### 8.30.3.3 virtual const word\_uid& uva::smt::bpbd::server::lm::proxy::lm\_fast\_query\_proxy::get\_begin\_tag\_uid ( ) const [pure virtual]

Allows to retrieve the begin tag uid value

##### Returns

the begin tag "<s>" uid

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy\\_local< trie\\_type >](#).

8.30.3.4 `virtual const word_uid& uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy::get_end_tag_uid ( ) const`  
`[pure virtual]`

Allows to retrieve the end tag uid value

#### Returns

the end tag "</s>" uid

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy\\_local< trie\\_type >](#).

8.30.3.5 `virtual prob_weight uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy::get_unk_word_prob ( ) const`  
`[pure virtual]`

Allows to retrieve the unknown target word log probability penalty

#### Returns

the target source word log probability penalty

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy\\_local< trie\\_type >](#).

8.30.3.6 `virtual void uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy::get_word_ids ( text_piece_reader phrase, phrase_length & num_words, word_uid word_ids[tm::TM_MAX_TARGET_PHRASE_LEN] ) const` `[pure virtual]`

Allows to retrieve the target language phrase word ids. Note that the number of words in the target phrase should not exceed: TM\_MAX\_TARGET\_PHRASE\_LEN

#### Parameters

|                  |                                     |
|------------------|-------------------------------------|
| <i>phrase</i>    | [in] the target language phrase     |
| <i>num_words</i> | [out] the number of words to be set |
| <i>word_ids</i>  | [out] the words ids to be set       |

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy\\_local< trie\\_type >](#).

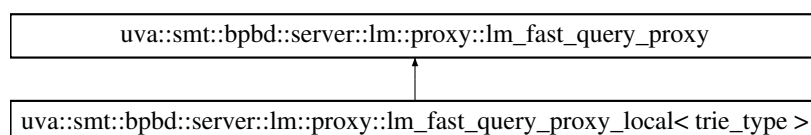
The documentation for this class was generated from the following file:

- [inc/server/lm/proxy/lm\\_fast\\_query\\_proxy.hpp](#)

## 8.31 uva::smt::bpbd::server::lm::proxy::lm\_fast\_query\_proxy\_local< trie\_type > Class Template Reference

```
#include <lm_fast_query_proxy_local.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy_local< trie_type >`:



### Public Types

- typedef `trie_type::WordIndexType` [word\\_index\\_type](#)



## Public Member Functions

- `lm_fast_query_proxy_local` (const trie\_type &trie, const prob\_weight &unk\_word\_prob, const word\_uid &begin\_tag\_uid, const word\_uid &end\_tag\_uid)
- virtual `~lm_fast_query_proxy_local` ()
- virtual `prob_weight get_unk_word_prob` () const
- virtual const `word_uid & get_begin_tag_uid` () const
- virtual const `word_uid & get_end_tag_uid` () const
- virtual void `get_word_ids` (text\_piece\_reader phrase, phrase\_length &num\_words, word\_uid word\_ids[tm::TM\_MAX\_TARGET\_PHRASE\_LEN]) const
- virtual `prob_weight execute` (const phrase\_length num\_words, const word\_uid \*word\_ids)
- virtual `prob_weight execute` (const phrase\_length num\_words, const word\_uid \*word\_ids, phrase\_length &min\_level)

## Protected Member Functions

- string `get_m_gram_str` (const phrase\_length begin\_word\_idx, const phrase\_length end\_word\_idx) const
- string `get_query_str` () const
- void `get_report_interm_results` (const phrase\_length begin\_word\_idx, const phrase\_length first\_end\_word\_idx, const phrase\_length last\_end\_word\_idx)
- void `report_final_result` ()

### 8.31.1 Detailed Description

template<typename trie\_type>class uva::smt::bpbd::server::lm::proxy::lm\_fast\_query\_proxy\_local< trie\_type >

This is a local implementation of the language model query This implementation works with the local trie

Definition at line 51 of file lm\_fast\_query\_proxy\_local.hpp.

### 8.31.2 Member Typedef Documentation

8.31.2.1 template<typename trie\_type> typedef trie\_type::WordIndexType uva::smt::bpbd::server::lm::proxy::lm\_fast\_query\_proxy\_local< trie\_type >::word\_index\_type

Definition at line 54 of file lm\_fast\_query\_proxy\_local.hpp.

### 8.31.3 Constructor & Destructor Documentation

8.31.3.1 template<typename trie\_type> uva::smt::bpbd::server::lm::proxy::lm\_fast\_query\_proxy\_local< trie\_type >::lm\_fast\_query\_proxy\_local ( const trie\_type &trie, const prob\_weight &unk\_word\_prob, const word\_uid &begin\_tag\_uid, const word\_uid &end\_tag\_uid ) [inline]

The basic constructor that accepts the trie reference to query to Note that the begin and end tag uids are provided only for the sake of performance optimization.

#### Parameters

|                      |                                 |
|----------------------|---------------------------------|
| <i>trie</i>          | the trie to query               |
| <i>unk_word_prob</i> | the unknown word LM probability |
| <i>begin_tag_uid</i> | the begin sentence tag word uid |

|                    |                                 |
|--------------------|---------------------------------|
| <i>end_tag_uid</i> | the begin sentence tag word uid |
|--------------------|---------------------------------|

Definition at line 64 of file `lm_fast_query_proxy_local.hpp`.

8.31.3.2 `template<typename trie_type> virtual uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy_local<trie_type>::~~lm_fast_query_proxy_local( ) [inline],[virtual]`

See also

[lm\\_fast\\_query\\_proxy](#)

Definition at line 74 of file `lm_fast_query_proxy_local.hpp`.

### 8.31.4 Member Function Documentation

8.31.4.1 `template<typename trie_type> virtual prob_weight uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy_local<trie_type>::execute( const phrase_length num_words, const word_uid * word_ids ) [inline],[virtual]`

See also

[lm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy](#).

Definition at line 133 of file `lm_fast_query_proxy_local.hpp`.

8.31.4.2 `template<typename trie_type> virtual prob_weight uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy_local<trie_type>::execute( const phrase_length num_words, const word_uid * word_ids, phrase_length & min_level ) [inline],[virtual]`

See also

[lm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy](#).

Definition at line 149 of file `lm_fast_query_proxy_local.hpp`.

8.31.4.3 `template<typename trie_type> virtual const word_uid& uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy_local<trie_type>::get_begin_tag_uid( ) const [inline],[virtual]`

See also

[lm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy](#).

Definition at line 88 of file `lm_fast_query_proxy_local.hpp`.

8.31.4.4 `template<typename trie_type> virtual const word_uid& uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy_local<trie_type>::get_end_tag_uid( ) const [inline],[virtual]`

See also

[lm\\_query\\_proxy](#)

Implements [uva::smt::bpbdd::server::lm::proxy::lm\\_fast\\_query\\_proxy](#).

Definition at line 95 of file `lm_fast_query_proxy_local.hpp`.

**8.31.4.5** `template<typename trie_type> string uva::smt::bpbdd::server::lm::proxy::lm_fast_query_proxy_local< trie_type >::get_m_gram_str ( const phrase_length begin_word_idx, const phrase_length end_word_idx ) const [inline], [protected]`

For the given N-gram, for some level  $M \leq N$ , this method allows to give the string of the object for which the probability is computed, e.g.: N-gram = "word1" -> result = "word1" N-gram = "word1 word2 word3" -> result = "word3 | word1 word2" for the first M tokens of the N-gram

Parameters

|                       |                               |
|-----------------------|-------------------------------|
| <i>begin_word_idx</i> | the m-gram's begin word index |
| <i>end_word_idx</i>   | the m-gram's begin word index |

Returns

the resulting string

Definition at line 224 of file `lm_fast_query_proxy_local.hpp`.

**8.31.4.6** `template<typename trie_type> string uva::smt::bpbdd::server::lm::proxy::lm_fast_query_proxy_local< trie_type >::get_query_str ( ) const [inline], [protected]`

For the given N-gram, this method allows to give the string of the object for which the probability is computed, e.g.: N-gram = "word1" -> result = "word1" N-gram = "word1 word2 word3" -> result = "word1 word2 word3"

Returns

the resulting string

Definition at line 247 of file `lm_fast_query_proxy_local.hpp`.

**8.31.4.7** `template<typename trie_type> void uva::smt::bpbdd::server::lm::proxy::lm_fast_query_proxy_local< trie_type >::get_report_interm_results ( const phrase_length begin_word_idx, const phrase_length first_end_word_idx, const phrase_length last_end_word_idx ) [inline], [protected]`

Allows add up the intermediate results of the loose sub-sub queries defined by the arguments

Parameters

|                           |                                        |
|---------------------------|----------------------------------------|
| <i>begin_word_idx</i>     | the sub query begin word index         |
| <i>first_end_word_idx</i> | the first sub-sub query end word index |
| <i>last_end_word_idx</i>  | the last sub-sub query end word index  |

Definition at line 267 of file `lm_fast_query_proxy_local.hpp`.

**8.31.4.8** `template<typename trie_type> virtual prob_weight uva::smt::bpbdd::server::lm::proxy::lm_fast_query_proxy_local< trie_type >::get_unk_word_prob ( ) const [inline], [virtual]`

See also

[lm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy](#).

Definition at line 81 of file `lm_fast_query_proxy_local.hpp`.

```
8.31.4.9 template<typename trie_type> virtual void uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy_↵
 local< trie_type >::get_word_ids (text_piece_reader phrase, phrase_length & num_words, word_uid
 word_ids[tm::TM_MAX_TARGET_PHRASE_LEN]) const [inline],[virtual]
```

See also

[lm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy](#).

Definition at line 102 of file `lm_fast_query_proxy_local.hpp`.

```
8.31.4.10 template<typename trie_type> void uva::smt::bpbd::server::lm::proxy::lm_fast_query_proxy_local<
 trie_type >::report_final_result () [inline],[protected]
```

Allows to report the total joint probability of the query

Definition at line 289 of file `lm_fast_query_proxy_local.hpp`.

The documentation for this class was generated from the following file:

- [inc/server/lm/proxy/lm\\_fast\\_query\\_proxy\\_local.hpp](#)

## 8.32 [uva::smt::bpbd::server::lm::arpa::lm\\_gram\\_builder< WordIndexType, CURR\\_LEV↵](#) EL, is\_mult\_weight > Class Template Reference

```
#include <lm_gram_builder.hpp>
```

### Public Member Functions

- [lm\\_gram\\_builder](#) (const [lm\\_parameters](#) &params, WordIndexType &word\_index, typename [TAddGram↵](#)  
[Func](#)< WordIndexType >::func addGarmFunc)
- bool [parse\\_line](#) ([text\\_piece\\_reader](#) &data)
- virtual [~lm\\_gram\\_builder](#) ()

### Static Public Member Functions

- static bool [unigram\\_to\\_prob](#) ([text\\_piece\\_reader](#) &text, [text\\_piece\\_reader](#) &word, [prob\\_weight](#) &prob)

### Protected Member Functions

- bool [parse\\_to\\_gram](#) ([text\\_piece\\_reader](#) &line)
- [lm\\_gram\\_builder](#) (const [lm\\_gram\\_builder](#) &orig)

## Protected Attributes

- const [lm\\_parameters](#) & [m\\_params](#)
- WordIndexType & [m\\_word\\_idx](#)
- [TAddGramFunc](#)< WordIndexType >::func [m\\_add\\_garm\\_func](#)
- [text\\_piece\\_reader](#) [m\\_token](#)
- [model\\_m\\_gram](#) [m\\_m\\_gram](#)

## Static Protected Attributes

- static const unsigned short int [MIN\\_NUM\\_TOKENS\\_NGRAM\\_STR](#) = 2
- static const unsigned short int [MAX\\_NUM\\_TOKENS\\_NGRAM\\_STR](#) = 3

### 8.32.1 Detailed Description

```
template<typename WordIndexType, phrase_length CURR_LEVEL, bool is_mult_weight>class uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight >
```

This class is responsible for splitting a piece of text in a number of ngrams and place it into the trie

Definition at line 58 of file [lm\\_gram\\_builder.hpp](#).

### 8.32.2 Constructor & Destructor Documentation

```
8.32.2.1 template<typename WordIndexType , phrase_length CURR_LEVEL, bool is_mult_weight>
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight
>::lm_gram_builder (const lm_parameters & params, WordIndexType & word_index, typename
TAddGramFunc< WordIndexType >::func addGarmFunc)
```

The constructor to be used in order to instantiate a N-Gram builder

Parameters

|                    |                                          |
|--------------------|------------------------------------------|
| <i>word_index</i>  | the word index to be used                |
| <i>level</i>       | the level of the N-grams to be processed |
| <i>addGarmFunc</i> | the strategy for adding the N-grams      |

Definition at line 61 of file [lm\\_gram\\_builder.cpp](#).

```
8.32.2.2 template<typename WordIndexType , phrase_length CURR_LEVEL, bool is_mult_weight>
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight
>::~~lm_gram_builder () [virtual]
```

Definition at line 72 of file [lm\\_gram\\_builder.cpp](#).

```
8.32.2.3 template<typename WordIndexType , phrase_length CURR_LEVEL, bool is_mult_weight>
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight
>::lm_gram_builder (const lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight > & orig)
[protected]
```

The copy constructor

## Parameters

|             |                           |
|-------------|---------------------------|
| <i>orig</i> | the other builder to copy |
|-------------|---------------------------|

Definition at line 67 of file `lm_gram_builder.cpp`.

### 8.32.3 Member Function Documentation

8.32.3.1 `template<typename WordIndexType , phrase_length CURR_LEVEL, bool is_mult_weight> bool  
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight  
>::parse_line ( text_piece_reader & data )`

This pure virtual method is supposed to parse the N-Gram string from the ARPA file format of a Back-Off language model and then add the obtained data to the Trie. This method has a default implementation that should work for N-grams with level > MIN\_NGRAM\_LEVEL and level < N

## Parameters

|             |                                                                       |
|-------------|-----------------------------------------------------------------------|
| <i>data</i> | the string to process, has to be space a separated sequence of tokens |
|-------------|-----------------------------------------------------------------------|

## Returns

returns true if the provided line is NOT recognized as the N-Gram of the specified level.

Definition at line 157 of file `lm_gram_builder.cpp`.

8.32.3.2 `template<typename WordIndexType , phrase_length CURR_LEVEL, bool is_mult_weight> bool  
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight  
>::parse_to_gram ( text_piece_reader & line ) [protected]`

Parse the given text into a N-Gram entry from the ARPA file

## Parameters

|             |                                            |
|-------------|--------------------------------------------|
| <i>line</i> | the piece of text to parse into the M-gram |
|-------------|--------------------------------------------|

## Returns

true if the line has been successfully parsed

Definition at line 76 of file `lm_gram_builder.cpp`.

8.32.3.3 `template<typename WordIndexType, phrase_length CURR_LEVEL, bool is_mult_weight> static bool  
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight  
>::unigram_to_prob ( text_piece_reader & text, text_piece_reader & word, prob_weight & prob )  
[inline], [static]`

Takes the uni-gram line and parses it to the word and its probability, no back-off weight!

## Parameters

|             |                                                      |
|-------------|------------------------------------------------------|
| <i>text</i> | the piece to read the uni-gram line from             |
| <i>word</i> | [out] the text piece reader to read the word into    |
| <i>prob</i> | [out] the variable to set the probability value into |

## Returns

true if the uni-gram was successfully parsed

Definition at line 89 of file `lm_gram_builder.hpp`.

#### 8.32.4 Member Data Documentation

8.32.4.1 `template<typename WordIndexType, phrase_length CURR_LEVEL, bool is_mult_weight>  
TAddGramFunc<WordIndexType>::func uva::smt::bpbd::server::lm::arpa::lm_gram_builder<  
WordIndexType, CURR_LEVEL, is_mult_weight >::m_add_garm_func [protected]`

Definition at line 129 of file lm\_gram\_builder.hpp.

8.32.4.2 `template<typename WordIndexType, phrase_length CURR_LEVEL, bool is_mult_weight> model_m_gram  
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight  
>::m_m_gram [protected]`

Definition at line 135 of file lm\_gram\_builder.hpp.

8.32.4.3 `template<typename WordIndexType, phrase_length CURR_LEVEL, bool is_mult_weight> const lm_parameters&  
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight  
>::m_params [protected]`

Definition at line 124 of file lm\_gram\_builder.hpp.

8.32.4.4 `template<typename WordIndexType, phrase_length CURR_LEVEL, bool is_mult_weight> text_piece_reader  
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight  
>::m_token [protected]`

Definition at line 132 of file lm\_gram\_builder.hpp.

8.32.4.5 `template<typename WordIndexType, phrase_length CURR_LEVEL, bool is_mult_weight> WordIndexType&  
uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight  
>::m_word_idx [protected]`

Definition at line 126 of file lm\_gram\_builder.hpp.

8.32.4.6 `template<typename WordIndexType, phrase_length CURR_LEVEL, bool is_mult_weight> const unsigned short  
int uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight  
>::MAX_NUM_TOKENS_NGRAM_STR = 3 [static], [protected]`

Definition at line 139 of file lm\_gram\_builder.hpp.

8.32.4.7 `template<typename WordIndexType, phrase_length CURR_LEVEL, bool is_mult_weight> const unsigned short  
int uva::smt::bpbd::server::lm::arpa::lm_gram_builder< WordIndexType, CURR_LEVEL, is_mult_weight  
>::MIN_NUM_TOKENS_NGRAM_STR = 2 [static], [protected]`

Definition at line 138 of file lm\_gram\_builder.hpp.

The documentation for this class was generated from the following files:

- [inc/server/lm/builders/lm\\_gram\\_builder.hpp](#)
- [src/server/lm/builders/lm\\_gram\\_builder.cpp](#)

### 8.33 `uva::smt::bpbd::server::lm::arpa::lm_gram_builder_factory< TrieType >` Class Template Reference

```
#include <lm_gram_builder_factory.hpp>
```

#### Public Types

- typedef `TrieType::WordIndexType` [WordIndexType](#)

#### Public Member Functions

- virtual [~lm\\_gram\\_builder\\_factory](#) ()

#### Static Public Member Functions

- template<phrase\_length CURR\_LEVEL, bool is\_mult\_weight>  
static void [get\\_builder](#) (const [lm\\_parameters](#) &params, `TrieType` &trie, [lm\\_gram\\_builder](#)< [WordIndexType](#), CURR\_LEVEL, is\_mult\_weight > \*\*ppBuilder)

#### 8.33.1 Detailed Description

```
template<typename TrieType>class uva::smt::bpbd::server::lm::arpa::lm_gram_builder_factory< TrieType >
```

This is the ARPA N-gram Builder Factory class that is supposed to be used to instantiate the proper ARPA N-Gram Builder class. Note that there can be a small difference in the data provided for the N-grams of different levels. For example the N-gram of the maximum level does not have back-off weights, so knowing that can allow for a more optimal reading the data and filling in the Trie. Also the first level N-grams (N==1) are just words and have to be added as vocabulary words into the Trie and not as regular N-grams.

Definition at line 64 of file `lm_gram_builder_factory.hpp`.

#### 8.33.2 Member Typedef Documentation

8.33.2.1 template<typename `TrieType`> typedef `TrieType::WordIndexType` `uva::smt::bpbd::server::lm::arpa::lm_gram_builder_factory< TrieType >::WordIndexType`

Definition at line 66 of file `lm_gram_builder_factory.hpp`.

#### 8.33.3 Constructor & Destructor Documentation

8.33.3.1 template<typename `TrieType`> virtual `uva::smt::bpbd::server::lm::arpa::lm_gram_builder_factory< TrieType >::~lm_gram_builder_factory ( )` [`inline`], [`virtual`]

Definition at line 112 of file `lm_gram_builder_factory.hpp`.

#### 8.33.4 Member Function Documentation



```
8.33.4.1 template<typename TrieType> template<phrase_length CURR_LEVEL, bool is_mult_weight> static void
uva::smt::bpbd::server::lm::arpa::lm_gram_builder_factory< TrieType >::get_builder (const
lm_parameters & params, TrieType & trie, lm_gram_builder< WordIndexType, CURR_LEVEL,
is_mult_weight > ** ppBuilder) [inline], [static]
```

This is a template method for getting the proper ARPA N-gram Builder for the given N-gram level. The two template parameters of this method N and doCache have to do with the Trie template parameters. N is the maximum N-gram level and doCache indicates whether the given Trie does caching of query results.

Note: the returned pointer to the dynamically allocated builder is to be freed by the caller!

#### Parameters

|                   |                                                                                         |
|-------------------|-----------------------------------------------------------------------------------------|
| <i>CURR_LEVEL</i> | the level of the N-gram we currently need the builder for.                              |
| <i>params</i>     | the model parameters weights are to be multiplies with the language model m-gram weight |
| <i>trie</i>       | the trie to be filled in with the N-grams                                               |
| <i>pBuilder</i>   | the pointer to a dynamically allocated N-Gram builder                                   |

Definition at line 86 of file lm\_gram\_builder\_factory.hpp.

The documentation for this class was generated from the following file:

- inc/server/lm/builders/lm\_gram\_builder\_factory.hpp

## 8.34 uva::smt::bpbd::server::lm::lm\_parameters Struct Reference

```
#include <lm_parameters.hpp>
```

### Public Member Functions

- bool [is\\_lm\\_weight](#) () const
- const float & [get\\_lm\\_weight](#) () const
- void [finalize](#) ()

### Public Attributes

- string [m\\_conn\\_string](#)
- size\_t [m\\_num\\_lambdas](#)
- float [m\\_lambdas](#) [NUM\_LM\_FEATURES]

### 8.34.1 Detailed Description

This structure is needed to store the language model parameters

Definition at line 53 of file lm\_parameters.hpp.

### 8.34.2 Member Function Documentation

```
8.34.2.1 void uva::smt::bpbd::server::lm::lm_parameters::finalize () [inline]
```

Allows to verify the parameters to be correct.

Definition at line 83 of file lm\_parameters.hpp.

**8.34.2.2** `const float& uva::smt::bpbd::server::lm::lm_parameters::get_lm_weight ( ) const` `[inline]`

Allows to retrieve the language model m-gram weight

Returns

the language model m-gram weight

Definition at line 76 of file `lm_parameters.hpp`.

**8.34.2.3** `bool uva::smt::bpbd::server::lm::lm_parameters::is_lm_weight ( ) const` `[inline]`

Allows to detect that the lm weight is set and needs to be used

Returns

true if we need to multiply with the lambda weight otherwise not.

Definition at line 68 of file `lm_parameters.hpp`.

### 8.34.3 Member Data Documentation

**8.34.3.1** `string uva::smt::bpbd::server::lm::lm_parameters::m_conn_string`

Definition at line 55 of file `lm_parameters.hpp`.

**8.34.3.2** `float uva::smt::bpbd::server::lm::lm_parameters::m_lambdas[NUM_LM_FEATURES]`

Definition at line 62 of file `lm_parameters.hpp`.

**8.34.3.3** `size_t uva::smt::bpbd::server::lm::lm_parameters::m_num_lambdas`

Definition at line 59 of file `lm_parameters.hpp`.

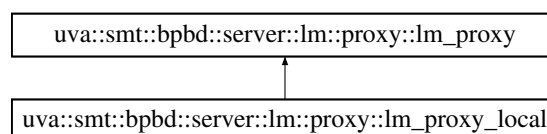
The documentation for this struct was generated from the following file:

- [inc/server/lm/lm\\_parameters.hpp](#)

## 8.35 uva::smt::bpbd::server::lm::proxy::lm\_proxy Class Reference

```
#include <lm_proxy.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::proxy::lm_proxy`:



## Public Member Functions

- virtual void [connect](#) (const [lm\\_parameters](#) &params)=0
- virtual void [disconnect](#) ()=0
- virtual [~lm\\_proxy](#) ()
- virtual [lm\\_slow\\_query\\_proxy](#) & [allocate\\_slow\\_query\\_proxy](#) ()=0
- virtual void [dispose\\_slow\\_query\\_proxy](#) ([lm\\_slow\\_query\\_proxy](#) &query)=0
- virtual [lm\\_fast\\_query\\_proxy](#) & [allocate\\_fast\\_query\\_proxy](#) ()=0
- virtual void [dispose\\_fast\\_query\\_proxy](#) ([lm\\_fast\\_query\\_proxy](#) &query)=0

### 8.35.1 Detailed Description

This is the trie proxy interface class it allows to interact with templated tries in a uniform way.

Definition at line 44 of file [lm\\_proxy.hpp](#).

### 8.35.2 Constructor & Destructor Documentation

8.35.2.1 virtual [uva::smt::bpbd::server::lm::proxy::lm\\_proxy::~lm\\_proxy](#) ( ) [\[inline\]](#), [\[virtual\]](#)

The basic virtual destructor

Definition at line 61 of file [lm\\_proxy.hpp](#).

### 8.35.3 Member Function Documentation

8.35.3.1 virtual [lm\\_fast\\_query\\_proxy](#)& [uva::smt::bpbd::server::lm::proxy::lm\\_proxy::allocate\\_fast\\_query\\_proxy](#) ( ) [\[pure virtual\]](#)

This method allows to get a trie query executor for the given trie

Returns

the trie query proxy object

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local](#).

8.35.3.2 virtual [lm\\_slow\\_query\\_proxy](#)& [uva::smt::bpbd::server::lm::proxy::lm\\_proxy::allocate\\_slow\\_query\\_proxy](#) ( ) [\[pure virtual\]](#)

This method allows to get a trie query executor for the given trie

Returns

the trie query proxy object

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local](#).

8.35.3.3 virtual void [uva::smt::bpbd::server::lm::proxy::lm\\_proxy::connect](#) ( const [lm\\_parameters](#) & *params* ) [\[pure virtual\]](#)

Allows to connect to the trie object based on the given parameters

## Parameters

|               |                      |
|---------------|----------------------|
| <i>params</i> | the model parameters |
|---------------|----------------------|

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local](#).

**8.35.3.4** `virtual void uva::smt::bpbd::server::lm::proxy::lm_proxy::disconnect ( ) [pure virtual]`

Allows to disconnect from the trie

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local](#).

**8.35.3.5** `virtual void uva::smt::bpbd::server::lm::proxy::lm_proxy::dispose_fast_query_proxy ( lm_fast_query_proxy & query ) [pure virtual]`

Dispose the previously allocated trie query object

## Parameters

|              |                           |
|--------------|---------------------------|
| <i>query</i> | the trie query to dispose |
|--------------|---------------------------|

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local](#).

**8.35.3.6** `virtual void uva::smt::bpbd::server::lm::proxy::lm_proxy::dispose_slow_query_proxy ( lm_slow_query_proxy & query ) [pure virtual]`

Dispose the previously allocated trie query object

## Parameters

|              |                           |
|--------------|---------------------------|
| <i>query</i> | the trie query to dispose |
|--------------|---------------------------|

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local](#).

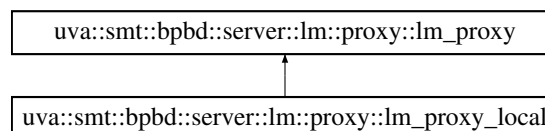
The documentation for this class was generated from the following file:

- [inc/server/lm/proxy/lm\\_proxy.hpp](#)

## 8.36 uva::smt::bpbd::server::lm::proxy::lm\_proxy\_local Class Reference

```
#include <lm_proxy_local.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::proxy::lm_proxy_local`:



### Public Member Functions

- [lm\\_proxy\\_local](#) ()
- virtual [~lm\\_proxy\\_local](#) ()
- virtual void [connect](#) (const [lm\\_parameters](#) &params)
- virtual void [disconnect](#) ()
- virtual [lm\\_fast\\_query\\_proxy](#) & [allocate\\_fast\\_query\\_proxy](#) ()

- virtual void [dispose\\_fast\\_query\\_proxy](#) ([lm\\_fast\\_query\\_proxy](#) &query)
- virtual [lm\\_slow\\_query\\_proxy](#) & [allocate\\_slow\\_query\\_proxy](#) ()
- virtual void [dispose\\_slow\\_query\\_proxy](#) ([lm\\_slow\\_query\\_proxy](#) &query)

## Protected Attributes

- [lm\\_word\\_index](#) m\_word\_index
- [lm\\_model\\_type](#) m\_model
- [prob\\_weight](#) m\_unk\_word\_prob
- [word\\_uid](#) m\_begin\_tag\_uid
- [word\\_uid](#) m\_end\_tag\_uid

### 8.36.1 Detailed Description

This is a local trie proxy implementation of the trie proxy interface. Here we do not connect to remote server or something but rather work with a locally loaded trie model.

Definition at line 67 of file [lm\\_proxy\\_local.hpp](#).

### 8.36.2 Constructor & Destructor Documentation

8.36.2.1 [uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local::lm\\_proxy\\_local](#) ( ) [\[inline\]](#)

The basic constructor of the trie proxy implementation class

Parameters

|               |                               |
|---------------|-------------------------------|
| <i>params</i> | the language model parameters |
|---------------|-------------------------------|

Definition at line 74 of file [lm\\_proxy\\_local.hpp](#).

8.36.2.2 [virtual uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local::~~lm\\_proxy\\_local](#) ( ) [\[inline\]](#), [\[virtual\]](#)

See also

[lm\\_proxy](#)

Definition at line 80 of file [lm\\_proxy\\_local.hpp](#).

### 8.36.3 Member Function Documentation

8.36.3.1 [virtual lm\\_fast\\_query\\_proxy& uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local::allocate\\_fast\\_query\\_proxy](#) ( ) [\[inline\]](#), [\[virtual\]](#)

**Todo** {In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[lm\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_proxy](#).

Definition at line 114 of file [lm\\_proxy\\_local.hpp](#).

8.36.3.2 `virtual lm_slow_query_proxy& uva::smt::bpbd::server::lm::proxy::lm_proxy_local::allocate_slow_query_proxy ( )`  
`[inline], [virtual]`

**Todo** {In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[lm\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_proxy](#).

Definition at line 132 of file `lm_proxy_local.hpp`.

8.36.3.3 `virtual void uva::smt::bpbd::server::lm::proxy::lm_proxy_local::connect ( const lm_parameters & params )`  
`[inline], [virtual]`

See also

[lm\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_proxy](#).

Definition at line 88 of file `lm_proxy_local.hpp`.

8.36.3.4 `virtual void uva::smt::bpbd::server::lm::proxy::lm_proxy_local::disconnect ( )` `[inline], [virtual]`

See also

[lm\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_proxy](#).

Definition at line 104 of file `lm_proxy_local.hpp`.

8.36.3.5 `virtual void uva::smt::bpbd::server::lm::proxy::lm_proxy_local::dispose_fast_query_proxy ( lm_fast_query_proxy & query )`  
`[inline], [virtual]`

**Todo** {In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[lm\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_proxy](#).

Definition at line 123 of file `lm_proxy_local.hpp`.

8.36.3.6 `virtual void uva::smt::bpbd::server::lm::proxy::lm_proxy_local::dispose_slow_query_proxy ( lm_slow_query_proxy & query )`  
`[inline], [virtual]`

**Todo** {In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[lm\\_proxy](#)

Implements [uva::smt::bpbd::server::lm::proxy::lm\\_proxy](#).

Definition at line 141 of file `lm_proxy_local.hpp`.

### 8.36.4 Member Data Documentation

8.36.4.1 **word\_uid** uva::smt::bpbd::server::lm::proxy::lm\_proxy\_local::m\_begin\_tag\_uid [protected]

Definition at line 243 of file lm\_proxy\_local.hpp.

8.36.4.2 **word\_uid** uva::smt::bpbd::server::lm::proxy::lm\_proxy\_local::m\_end\_tag\_uid [protected]

Definition at line 244 of file lm\_proxy\_local.hpp.

8.36.4.3 **lm\_model\_type** uva::smt::bpbd::server::lm::proxy::lm\_proxy\_local::m\_model [protected]

Definition at line 237 of file lm\_proxy\_local.hpp.

8.36.4.4 **prob\_weight** uva::smt::bpbd::server::lm::proxy::lm\_proxy\_local::m\_unk\_word\_prob [protected]

Definition at line 240 of file lm\_proxy\_local.hpp.

8.36.4.5 **lm\_word\_index** uva::smt::bpbd::server::lm::proxy::lm\_proxy\_local::m\_word\_index [protected]

Definition at line 234 of file lm\_proxy\_local.hpp.

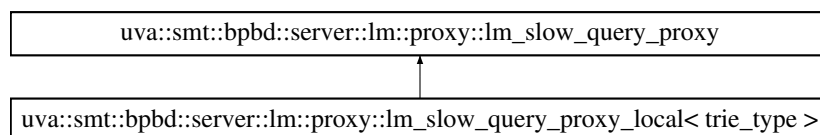
The documentation for this class was generated from the following file:

- [inc/server/lm/proxy/lm\\_proxy\\_local.hpp](#)

## 8.37 uva::smt::bpbd::server::lm::proxy::lm\_slow\_query\_proxy Class Reference

```
#include <lm_slow_query_proxy.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::lm::proxy::lm\_slow\_query\_proxy:



### Public Member Functions

- virtual [~lm\\_slow\\_query\\_proxy](#) ()
- virtual void [execute](#) ([text\\_piece\\_reader](#) &line)=0

### 8.37.1 Detailed Description

This class represents a trie query proxy interface class. It allows to interact with templated trie queries in a uniform way.

Definition at line 48 of file lm\_slow\_query\_proxy.hpp.

### 8.37.2 Constructor & Destructor Documentation

8.37.2.1 `virtual uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy::~~lm_slow_query_proxy ( ) [inline], [virtual]`

The basic virtual destructor

Definition at line 54 of file `lm_slow_query_proxy.hpp`.

### 8.37.3 Member Function Documentation

8.37.3.1 `virtual void uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy::execute ( text_piece_reader & line ) [pure virtual]`

Allows to execute m-gram the query. The query starts with the m-gram size given by `min_level` and then grows until the maximum of `LM_M_GRAM_LEVEL_MAX`. After that m-grams of the `LM_M_GRAM_LEVEL_MAX` are computed via a sliding window: Let: "`min_level == 2`", "`LM_MAX_QUERY_LEN = 4`", "`num_word_ids == 6`" and "`word_ids == w1w2w3w4w5w6`". Then this method will compute the sum:  $P(w2|w1) + P(w3|w1w2) + P(w4|w1w2w3) + P(w5|w2w3w4) + P(w6|w3w4w5)$

Parameters

|                   |                                                     |
|-------------------|-----------------------------------------------------|
| <code>line</code> | the text piece reader storing the m-gram query line |
|-------------------|-----------------------------------------------------|

Implemented in [uva::smt::bpbd::server::lm::proxy::lm\\_slow\\_query\\_proxy\\_local< trie\\_type >](#).

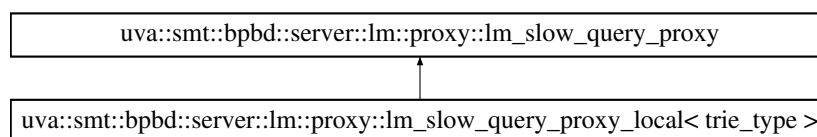
The documentation for this class was generated from the following file:

- [inc/server/lm/proxy/lm\\_slow\\_query\\_proxy.hpp](#)

## 8.38 uva::smt::bpbd::server::lm::proxy::lm\_slow\_query\_proxy\_local< trie\_type > Class Template Reference

```
#include <lm_slow_query_proxy_local.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >`:



### Public Types

- `typedef trie_type::WordIndexType` [word\\_index\\_type](#)

### Public Member Functions

- [lm\\_slow\\_query\\_proxy\\_local](#) (const `trie_type` &trie)
- `virtual ~lm_slow_query_proxy_local ()`
- `virtual void execute` (`text_piece_reader` &line)



## Protected Member Functions

- void [get\\_report\\_interm\\_results](#) (const [phrase\\_length](#) begin\_word\_idx, const [phrase\\_length](#) first\_end\_word\_idx, const [phrase\\_length](#) last\_end\_word\_idx)
- void [report\\_final\\_result](#) ()
- string [get\\_m\\_gram\\_str](#) (const [phrase\\_length](#) begin\_word\_idx, const [phrase\\_length](#) end\_word\_idx) const
- string [get\\_query\\_str](#) () const
- virtual void [set\\_tokens\\_and\\_word\\_ids](#) ([text\\_piece\\_reader](#) phrase)

### 8.38.1 Detailed Description

```
template<typename trie_type>class uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >
```

This is a local implementation of the language model query This implementation works with the local trie  
Definition at line 51 of file `lm_slow_query_proxy_local.hpp`.

### 8.38.2 Member Typedef Documentation

8.38.2.1 `template<typename trie_type > typedef trie_type::WordIndexType uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >::word_index_type`

Definition at line 54 of file `lm_slow_query_proxy_local.hpp`.

### 8.38.3 Constructor & Destructor Documentation

8.38.3.1 `template<typename trie_type > uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >::lm_slow_query_proxy_local ( const trie_type & trie ) [inline]`

The basic constructor that accepts the trie reference to query to

Parameters

|             |                   |
|-------------|-------------------|
| <i>trie</i> | the trie to query |
|-------------|-------------------|

Definition at line 60 of file `lm_slow_query_proxy_local.hpp`.

8.38.3.2 `template<typename trie_type > virtual uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >::~lm_slow_query_proxy_local ( ) [inline],[virtual]`

See also

`lm_query_proxy`

Definition at line 68 of file `lm_slow_query_proxy_local.hpp`.

### 8.38.4 Member Function Documentation

8.38.4.1 `template<typename trie_type > virtual void uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >::execute ( text_piece_reader & line ) [inline],[virtual]`

Allows to execute m-gram the query. The query starts with the m-gram size given by `min_level` and then grows until the maximum of `LM_M_GRAM_LEVEL_MAX`. After that m-grams of the `LM_M_GRAM_LEVEL_MAX` are computed

via a sliding window: Let: "min\_level == 2", "LM\_MAX\_QUERY\_LEN = 4", "num\_word\_ids == 6" and "word\_ids == w1w2w3w4w5w6" Then this method will compute the sum:  $P(w_2|w_1) + P(w_3|w_1w_2) + P(w_4|w_1w_2w_3) + P(w_5|w_2w_3w_4) + P(w_6|w_3w_4w_5)$

## Parameters

|             |                                                     |
|-------------|-----------------------------------------------------|
| <i>line</i> | the text piece reader storing the m-gram query line |
|-------------|-----------------------------------------------------|

Implements `uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy`.

Definition at line 83 of file `lm_slow_query_proxy_local.hpp`.

**8.38.4.2** `template<typename trie_type > string uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >::get_m_gram_str ( const phrase_length begin_word_idx, const phrase_length end_word_idx ) const [inline], [protected]`

For the given N-gram, for some level  $M \leq N$ , this method allows to give the string of the object for which the probability is computed, e.g.: N-gram = "word1" -> result = "word1" N-gram = "word1 word2 word3" -> result = "word3 | word1 word2" for the first M tokens of the N-gram

## Parameters

|                       |                               |
|-----------------------|-------------------------------|
| <i>begin_word_idx</i> | the m-gram's begin word index |
| <i>end_word_idx</i>   | the m-gram's begin word index |

## Returns

the resulting string

Definition at line 191 of file `lm_slow_query_proxy_local.hpp`.

**8.38.4.3** `template<typename trie_type > string uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >::get_query_str ( ) const [inline], [protected]`

For the given N-gram, this method allows to give the string of the object for which the probability is computed, e.g.: N-gram = "word1" -> result = "word1" N-gram = "word1 word2 word3" -> result = "word1 word2 word3"

## Returns

the resulting string

Definition at line 215 of file `lm_slow_query_proxy_local.hpp`.

**8.38.4.4** `template<typename trie_type > void uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >::get_report_interm_results ( const phrase_length begin_word_idx, const phrase_length first_end_word_idx, const phrase_length last_end_word_idx ) [inline], [protected]`

Allows report the intermediate results of the loose sub-sub queries defined by the arguments

## Parameters

|                           |                                        |
|---------------------------|----------------------------------------|
| <i>begin_word_idx</i>     | the sub query begin word index         |
| <i>first_end_word_idx</i> | the first sub-sub query end word index |
| <i>last_end_word_idx</i>  | the last sub-sub query end word index  |

Definition at line 148 of file `lm_slow_query_proxy_local.hpp`.

**8.38.4.5** `template<typename trie_type > void uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_local< trie_type >::report_final_result ( ) [inline], [protected]`

Allows to report the total joint probability of the query

Definition at line 170 of file `lm_slow_query_proxy_local.hpp`.

```
8.38.4.6 template<typename trie_type > virtual void uva::smt::bpbd::server::lm::proxy::lm_slow_query_proxy_↵
 local< trie_type >::set_tokens_and_word_ids (text_piece_reader phrase) [inline],[protected],
 [virtual]
```

Allows to parse the m-gram into the tokens and get the word ids

Definition at line 235 of file `lm_slow_query_proxy_local.hpp`.

The documentation for this class was generated from the following file:

- [inc/server/lm/proxy/lm\\_slow\\_query\\_proxy\\_local.hpp](#)

## 8.39 uva::utils::logging::logger Class Reference

```
#include <logger.hpp>
```

### Public Member Functions

- virtual [~logger](#) ()

### Static Public Member Functions

- static void [get\\_reporting\\_levels](#) (vector< string > \*p\_reporting\_levels)
- static void [set\\_reporting\\_level](#) (const string level)
- static std::ostream & [get](#) (debug\_levels\_enum level)
- static std::ostream & [get](#) (debug\_levels\_enum level, const char \*file, const char \*func, const char \*line)
- static bool [is\\_relevant\\_level](#) (const debug\_levels\_enum &level)
- static debug\_levels\_enum & [get\\_reporting\\_level](#) ()
- static const string [get\\_curr\\_level\\_str](#) ()
- static void [start\\_progress\\_bar](#) (const string &msg)
- static void [update\\_progress\\_bar](#) ()
- static void [stop\\_progress\\_bar](#) ()
- static bool [is\\_progress\\_bar\\_on](#) ()

### 8.39.1 Detailed Description

This is a trivial logging facility that exhibits a singleton behavior and does output to stderr and stdout.

Definition at line 147 of file `logger.hpp`.

### 8.39.2 Constructor & Destructor Documentation

```
8.39.2.1 virtual uva::utils::logging::logger::~~logger () [inline],[virtual]
```

Definition at line 150 of file `logger.hpp`.

### 8.39.3 Member Function Documentation

```
8.39.3.1 static std::ostream& uva::utils::logging::logger::get (debug_levels_enum level) [inline],[static]
```

This methods allows to get the output stream for the given log-level

## Parameters

|              |                                         |
|--------------|-----------------------------------------|
| <i>level</i> | the log level for the messages to print |
|--------------|-----------------------------------------|

## Returns

the output stream object

Definition at line 170 of file logger.hpp.

**8.39.3.2** `static std::ostream& uva::utils::logging::logger::get ( debug_levels_enum level, const char * file, const char * func, const char * line )` `[inline], [static]`

This methods allows to get the output stream for the given log-level

## Parameters

|              |                                         |
|--------------|-----------------------------------------|
| <i>level</i> | the log level for the messages to print |
|--------------|-----------------------------------------|

## Returns

the output stream object

Definition at line 179 of file logger.hpp.

**8.39.3.3** `static const string uva::utils::logging::logger::get_curr_level_str ( )` `[inline], [static]`

Allows to obtain the current reporting level string

## Returns

the current reporting level string

Definition at line 205 of file logger.hpp.

**8.39.3.4** `static debug_levels_enum& uva::utils::logging::logger::get_reporting_level ( )` `[inline], [static]`

Returns the reference to the internal log level variable

## Returns

the reference to the internal log level variable

Definition at line 197 of file logger.hpp.

**8.39.3.5** `void uva::utils::logging::logger::get_reporting_levels ( vector< string > * p_reporting_levels )` `[static]`

Allows to retrieve the list of supporter logging levels

## Parameters

|                           |                                                          |
|---------------------------|----------------------------------------------------------|
| <i>p_reporting_levels</i> | the pointer to the logging levels vector to be filled in |
|---------------------------|----------------------------------------------------------|

Definition at line 86 of file logger.cpp.

**8.39.3.6** `static bool uva::utils::logging::logger::is_progress_bar_on ( ) [inline],[static]`

The function allows to check if the progress bar is running or not

#### Returns

true if the progress bar is running, otherwise case;

Definition at line 232 of file logger.hpp.

**8.39.3.7** `static bool uva::utils::logging::logger::is_relevant_level ( const debug_levels_enum & level ) [inline],[static]`

Checks if the current reporting level is higher or equal to the given

#### Returns

the reporting level to check

true if the given reporting level is smaller or equal to the current, otherwise false

Definition at line 189 of file logger.hpp.

**8.39.3.8** `void uva::utils::logging::logger::set_reporting_level ( const string level ) [static]`

Allows to set the logging level from a string, if not recognized - reports a warning!

#### Parameters

|              |                         |
|--------------|-------------------------|
| <i>level</i> | the string level to set |
|--------------|-------------------------|

**Todo** {This function is ugly improve it by using a map, or a similar so that we could just get an appropriate level for the string.}

Definition at line 99 of file logger.cpp.

**8.39.3.9** `void uva::utils::logging::logger::start_progress_bar ( const string & msg ) [static]`

The function that start progress bar Works if the current debug level is <= INFO

#### Parameters

|            |                        |
|------------|------------------------|
| <i>msg</i> | the message to display |
|------------|------------------------|

Definition at line 186 of file logger.cpp.

**8.39.3.10** `void uva::utils::logging::logger::stop_progress_bar ( ) [static]`

The function that stops progress bar Works if the current debug level is <= INFO

Definition at line 227 of file logger.cpp.

**8.39.3.11** `void uva::utils::logging::logger::update_progress_bar ( ) [static]`

The function that updates progress bar Works if the current debug level is <= INFO

Definition at line 210 of file logger.cpp.

The documentation for this class was generated from the following files:

- [inc/common/utis/logging/logger.hpp](#)
- [src/common/utis/logging/logger.cpp](#)

## 8.40 uva::utils::logging::logging\_synch Struct Reference

```
#include <logger.hpp>
```

### Public Types

- typedef lock\_guard< recursive\_mutex > [rec\\_scoped\\_lock](#)

### Static Public Attributes

- static recursive\_mutex [mv](#)

#### 8.40.1 Detailed Description

This structures stores the recursive synchronization mutex for logging. The mutex is to be recursive as functions called when logging can do the own logging.

Definition at line 65 of file logger.hpp.

#### 8.40.2 Member Typedef Documentation

8.40.2.1 typedef lock\_guard<recursive\_mutex> uva::utils::logging::logging\_synch::rec\_scoped\_lock

Definition at line 67 of file logger.hpp.

#### 8.40.3 Member Data Documentation

8.40.3.1 recursive\_mutex uva::utils::logging::logging\_synch::mv [static]

Definition at line 69 of file logger.hpp.

The documentation for this struct was generated from the following files:

- [inc/common/utis/logging/logger.hpp](#)
- [src/common/utis/logging/logger.cpp](#)

## 8.41 uva::smt::bpbd::server::lm::m\_grams::m\_gram\_payload\_s Struct Reference

```
#include <m_gram_payload.hpp>
```

### Public Member Functions

- [m\\_gram\\_payload\\_s](#) ()
- [m\\_gram\\_payload\\_s](#) (prob\_weight prob, prob\_weight back)

## Public Attributes

- [prob\\_weight m\\_prob](#)
- [prob\\_weight m\\_back](#)

### 8.41.1 Detailed Description

This data structure stores the probability and back off weight payload for an m-gram

Definition at line 63 of file `m_gram_payload.hpp`.

### 8.41.2 Constructor & Destructor Documentation

8.41.2.1 `uva::smt::bpbd::server::lm::m_grams::m_gram_payload_s::m_gram_payload_s ( )` `[inline]`, `[explicit]`

Definition at line 67 of file `m_gram_payload.hpp`.

8.41.2.2 `uva::smt::bpbd::server::lm::m_grams::m_gram_payload_s::m_gram_payload_s ( prob_weight prob, prob_weight back )` `[inline]`

Definition at line 72 of file `m_gram_payload.hpp`.

### 8.41.3 Member Data Documentation

8.41.3.1 `prob_weight uva::smt::bpbd::server::lm::m_grams::m_gram_payload_s::m_back`

Definition at line 65 of file `m_gram_payload.hpp`.

8.41.3.2 `prob_weight uva::smt::bpbd::server::lm::m_grams::m_gram_payload_s::m_prob`

Definition at line 64 of file `m_gram_payload.hpp`.

The documentation for this struct was generated from the following file:

- `inc/server/lm/mgrams/m_gram_payload.hpp`

## 8.42 `uva::smt::bpbd::server::lm::m_gram_query` Class Reference

```
#include <m_gram_query.hpp>
```

## Public Types

- `typedef const void *` `payload_ptr`

## Public Member Functions

- `m_gram_query ()`
- `template<bool is_need_ctx_ids>`  
void `set_data` (const `phrase_length` num\_words, const `word_uid` \*word\_ids)
- `phrase_length` `get_query_begin_word_idx ()` const
- `phrase_length` `get_query_end_word_idx ()` const



- void [set\\_word\\_indexes](#) (const [phrase\\_length](#) sub\_query\_begin\_word\_idx, const [phrase\\_length](#) sub\_sub\_query\_first\_end\_word\_idx, const [phrase\\_length](#) sub\_query\_end\_word\_idx)
- void [set\\_word\\_indexes](#) (const [phrase\\_length](#) sub\_query\_begin\_word\_idx, const [phrase\\_length](#) sub\_query\_end\_word\_idx)
- [word\\_uid operator\[\]](#) (const [phrase\\_length](#) idx) const
- bool [is\\_not\\_finished](#) () const
- uint64\_t [get\\_curr\\_m\\_gram\\_hash](#) ()
- [word\\_uid](#) [get\\_curr\\_begin\\_word\\_id](#) () const
- [word\\_uid](#) [get\\_curr\\_end\\_word\\_id](#) () const
- [word\\_uid](#) [get\\_curr\\_uni\\_gram\\_word\\_id](#) () const
- void [set\\_curr\\_payload](#) (const void \*payload)
- const void \*& [get\\_curr\\_payload\\_ref](#) ()
- bool [is\\_curr\\_uni\\_gram](#) () const
- [phrase\\_length](#) [get\\_curr\\_level](#) () const
- [phrase\\_length](#) [get\\_curr\\_level\\_m1](#) () const
- [phrase\\_length](#) [get\\_curr\\_level\\_m2](#) () const
- const [TM\\_Gram\\_Id\\_Value\\_Ptr](#) [get\\_curr\\_m\\_gram\\_id](#) (uint8\_t &len\_bytes)
- [TLongId](#) & [get\\_curr\\_ctx\\_ref](#) ()

## Public Attributes

- [prob\\_weight](#) [m\\_probs](#) [[QUERY\\_M\\_GRAM\\_MAX\\_LEN](#)]
- [phrase\\_length](#) [m\\_curr\\_begin\\_word\\_idx](#)
- [phrase\\_length](#) [m\\_curr\\_end\\_word\\_idx](#)

## Friends

- ostream & [operator<<](#) (ostream &stream, const [m\\_gram\\_query](#) &value)

### 8.42.1 Detailed Description

This structure stores the basic data required for a query execution.

#### Parameters

|                         |                                                                                |
|-------------------------|--------------------------------------------------------------------------------|
| <i>m_query</i>          | the m-gram query itself                                                        |
| <i>m_payloads</i>       | the two dimensional array of the payloads                                      |
| <i>m_last_ctx_ids</i>   | stores the last context id computed for the given row of the sub-m-gram matrix |
| <i>m_probs</i>          | the array f probabilities                                                      |
| <i>m_begin_word_idx</i> | the currently considered begin word index                                      |
| <i>m_end_word_idx</i>   | the currently considered end word index                                        |

Definition at line 65 of file [m\\_gram\\_query.hpp](#).

### 8.42.2 Member Typedef Documentation

#### 8.42.2.1 typedef const void\* uva::smt::bpbd::server::lm::m\_gram\_query::payload\_ptr

Definition at line 68 of file [m\\_gram\\_query.hpp](#).

### 8.42.3 Constructor & Destructor Documentation

#### 8.42.3.1 `uva::smt::bpbd::server::lm::m_gram_query::m_gram_query ( )` `[inline]`

The basic constructor that gets a reference to the word index

## Parameters

|                   |                                 |
|-------------------|---------------------------------|
| <i>word_index</i> | the reference to the word index |
|-------------------|---------------------------------|

Definition at line 84 of file m\_gram\_query.hpp.

## 8.42.4 Member Function Documentation

### 8.42.4.1 word\_uid uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_begin\_word\_id ( ) const [inline]

Allows to get the current begin word id

#### Returns

the current begin word id

Definition at line 195 of file m\_gram\_query.hpp.

### 8.42.4.2 TLongId& uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_ctx\_ref ( ) [inline]

Allows to get a reference to the current context

#### Returns

the reference to the variable storing the current context value

Definition at line 289 of file m\_gram\_query.hpp.

### 8.42.4.3 word\_uid uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_end\_word\_id ( ) const [inline]

Allows to get the current end word id

#### Returns

the current end word id

Definition at line 203 of file m\_gram\_query.hpp.

### 8.42.4.4 phrase\_length uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_level ( ) const [inline]

Allows to get the level of the currently considered m-gram

#### Returns

the level of the currently considered m-gram

Definition at line 253 of file m\_gram\_query.hpp.

### 8.42.4.5 phrase\_length uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_level\_m1 ( ) const [inline]

Allows to get the "level - 1" of the currently considered m-gram

#### Returns

the "level - 1" of the currently considered m-gram

Definition at line 261 of file m\_gram\_query.hpp.

#### 8.42.4.6 phrase\_length uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_level\_m2( ) const [inline]

Allows to get the "level - 2" of the currently considered m-gram

##### Returns

the "level - 2" of the currently considered m-gram

Definition at line 269 of file m\_gram\_query.hpp.

#### 8.42.4.7 uint64\_t uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_m\_gram\_hash( ) [inline]

Allows to compute the hash value of the m-gram defined by the current begin and end word indexes

##### Returns

the hash of the current m-gram

Definition at line 187 of file m\_gram\_query.hpp.

#### 8.42.4.8 const TM\_Gram\_Id\_Value\_Ptr uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_m\_gram\_id( uint8\_t & len\_bytes ) [inline]

Allows to create a new m-gram id for the current m-gram defined by the current begin and end word index values. For the argument reference to the id data pointer the following holds: a) If there was no memory allocated for the M-gram id then there will be allocated as much as needed to store the given id. b) If there was memory allocated then no re-allocation will be done, then it is assumed that enough memory was allocated

##### Parameters

|                    |                                                                                                              |
|--------------------|--------------------------------------------------------------------------------------------------------------|
| <i>p_m_gram_id</i> | the reference to the M-gram id data pointer to be initialized with the M-gram id data, must be pre-allocated |
|--------------------|--------------------------------------------------------------------------------------------------------------|

Definition at line 281 of file m\_gram\_query.hpp.

#### 8.42.4.9 const void\* & uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_payload\_ref( ) [inline]

Allows to set the payload of the current m-gram defined by the current begin and end word indexes

##### Parameters

|                |                       |
|----------------|-----------------------|
| <i>payload</i> | the payload to be set |
|----------------|-----------------------|

Definition at line 237 of file m\_gram\_query.hpp.

#### 8.42.4.10 word\_uid uva::smt::bpbd::server::lm::m\_gram\_query::get\_curr\_uni\_gram\_word\_id( ) const [inline]

Allows to get the word id of the current uni-gram This method shall only be called in case: m\_curr\_begin\_word\_idx == m\_curr\_end\_word\_idx

##### Returns

the word id of the current uni-gram

Definition at line 213 of file m\_gram\_query.hpp.

8.42.4.11 **phrase\_length** uva::smt::bpbd::server::lm::m\_gram\_query::get\_query\_begin\_word\_idx ( ) const [inline]

Allows to get the begin word index of the query

#### Returns

the begin word index of the query

Definition at line 118 of file m\_gram\_query.hpp.

8.42.4.12 **phrase\_length** uva::smt::bpbd::server::lm::m\_gram\_query::get\_query\_end\_word\_idx ( ) const [inline]

Allows to get the end word index of the query

#### Returns

the end word index of the query

Definition at line 126 of file m\_gram\_query.hpp.

8.42.4.13 **bool** uva::smt::bpbd::server::lm::m\_gram\_query::is\_curr\_uni\_gram ( ) const [inline]

Allows to check if the current m-gram is a uni-gram

#### Returns

true if the current m-gram is a uni-gram, otherwise false

Definition at line 245 of file m\_gram\_query.hpp.

8.42.4.14 **bool** uva::smt::bpbd::server::lm::m\_gram\_query::is\_not\_finished ( ) const [inline]

Allows to check if the current sub-query execution is over or not

#### Returns

true if the sub-query execution is not finished yet

Definition at line 177 of file m\_gram\_query.hpp.

8.42.4.15 **word\_uid** uva::smt::bpbd::server::lm::m\_gram\_query::operator[] ( const phrase\_length idx ) const [inline]

Allows to retrieve the word id under the given index

#### Parameters

|            |                                         |
|------------|-----------------------------------------|
| <i>idx</i> | the index of the word we need an id for |
|------------|-----------------------------------------|

#### Returns

the word id

Definition at line 168 of file m\_gram\_query.hpp.

8.42.4.16 **void** uva::smt::bpbd::server::lm::m\_gram\_query::set\_curr\_payload ( const void \* payload ) [inline]

Allows to set the payload of the current m-gram defined by the current begin and end word indexes

## Parameters

|                |                       |
|----------------|-----------------------|
| <i>payload</i> | the payload to be set |
|----------------|-----------------------|

Definition at line 228 of file `m_gram_query.hpp`.

8.42.4.17 `template<bool is_need_ctx_ids> void uva::smt::bpbd::server::lm::m_gram_query::set_data ( const phrase_length num_words, const word_uid * word_ids ) [inline]`

Allows to set new data to the query

## Parameters

|                     |                                                                                       |
|---------------------|---------------------------------------------------------------------------------------|
| <i>num_word_ids</i> | stores the number of word ids, the maximum number of words must be QUERY_LENGTH       |
| <i>word_ids</i>     | the word identifiers of the words of the target phrase to compute the probability for |

Definition at line 95 of file `m_gram_query.hpp`.

8.42.4.18 `void uva::smt::bpbd::server::lm::m_gram_query::set_word_indexes ( const phrase_length sub_query_begin_word_idx, const phrase_length sub_sub_query_first_end_word_idx, const phrase_length sub_query_end_word_idx ) [inline]`

Allows to set the begin and end m-gram word index. These define the m-gram for which the probability is to be computed. This method is handy for when we need streaming for a number of sub-sub m-grams starting in the same word but of the incremented length

## Parameters

|                                                     |                                        |
|-----------------------------------------------------|----------------------------------------|
| <i>sub_query_↔<br/>begin_word_idx</i>               | the sub-query begin word index         |
| <i>first_sub_sub_↔<br/>query_end_↔<br/>word_idx</i> | the sub-sub query first end word index |
| <i>sub_query_↔<br/>end_word_idx</i>                 | the sub query end word index           |

Definition at line 139 of file `m_gram_query.hpp`.

8.42.4.19 `void uva::smt::bpbd::server::lm::m_gram_query::set_word_indexes ( const phrase_length sub_query_begin_word_idx, const phrase_length sub_query_end_word_idx ) [inline]`

Allows to set the begin and end m-gram word index. These define the m-gram for which the probability is to be computed. This method is needed for when we only need one m-gram probability without streaming

## Parameters

|                                       |                                |
|---------------------------------------|--------------------------------|
| <i>sub_query_↔<br/>begin_word_idx</i> | the sub-query begin word index |
| <i>sub_query_↔<br/>end_word_idx</i>   | the sub query end word index   |

Definition at line 155 of file `m_gram_query.hpp`.

## 8.42.5 Friends And Related Function Documentation

8.42.5.1 `ostream& operator<< ( ostream & stream, const m_gram_query & value ) [friend]`

Allows to serialize the m-gram query to the output stream as a string

## Parameters

|               |                                            |
|---------------|--------------------------------------------|
| <i>stream</i> | the reference to the stream to output into |
| <i>query</i>  | the query object to output                 |

## Returns

the reference to the stream

Definition at line 40 of file m\_gram\_query.cpp.

### 8.42.6 Member Data Documentation

#### 8.42.6.1 phrase\_length uva::smt::bpbd::server::lm::m\_gram\_query::m\_curr\_begin\_word\_idx

Definition at line 76 of file m\_gram\_query.hpp.

#### 8.42.6.2 phrase\_length uva::smt::bpbd::server::lm::m\_gram\_query::m\_curr\_end\_word\_idx

Definition at line 78 of file m\_gram\_query.hpp.

#### 8.42.6.3 prob\_weight uva::smt::bpbd::server::lm::m\_gram\_query::m\_probs[QUERY\_M\_GRAM\_MAX\_LEN]

Definition at line 73 of file m\_gram\_query.hpp.

The documentation for this class was generated from the following file:

- [inc/server/lm/models/m\\_gram\\_query.hpp](#)

## 8.43 uva::utils::containers::mem\_increase\_strategy Class Reference

```
#include <dynamic_memory_arrays.hpp>
```

### Public Member Functions

- [mem\\_increase\\_strategy](#) (const [mem\\_inc\\_types\\_enum](#) &stype, const [TCapacityIncFunct](#) get\_capacity\_inc↵\_func, const size\_t min\_mem\_inc, const size\_t mem\_inc\_factor)
- [mem\\_increase\\_strategy](#) ()
- [mem\\_increase\\_strategy](#) (const [mem\\_increase\\_strategy](#) &other)
- string [get\\_strategy\\_info](#) () const
- const size\_t [get\\_new\\_capacity](#) (const size\_t capacity) const

#### 8.43.1 Detailed Description

This class stores the memory increment strategy and allows to use it

Definition at line 74 of file dynamic\_memory\_arrays.hpp.

## 8.43.2 Constructor & Destructor Documentation

8.43.2.1 `uva::utils::containers::mem_increase_strategy::mem_increase_strategy ( const mem_inc_types_enum & stype, const TCapacityIncFunct get_capacity_inc_func, const size_t min_mem_inc, const size_t mem_inc_factor )`  
[inline]

The main constructor to be used



## Parameters

|                                    |                                                                                    |
|------------------------------------|------------------------------------------------------------------------------------|
| <i>stype</i>                       | the strategy type                                                                  |
| <i>get_capacity_↔<br/>inc_func</i> | the strategy function                                                              |
| <i>min_mem_inc</i>                 | the minimum memory increase in number of elements                                  |
| <i>mem_inc_factor</i>              | the memory increment factor, the number we will multiply by the computed increment |

Definition at line 94 of file `dynamic_memory_arrays.hpp`.

#### 8.43.2.2 uva::utils::containers::mem\_increase\_strategy::mem\_increase\_strategy ( ) [inline]

Definition at line 104 of file `dynamic_memory_arrays.hpp`.

#### 8.43.2.3 uva::utils::containers::mem\_increase\_strategy::mem\_increase\_strategy ( const mem\_increase\_strategy & other ) [inline]

Definition at line 109 of file `dynamic_memory_arrays.hpp`.

### 8.43.3 Member Function Documentation

#### 8.43.3.1 const size\_t uva::utils::containers::mem\_increase\_strategy::get\_new\_capacity ( const size\_t capacity ) const [inline]

Compute the new capacity given the provided one, this function used the capacity increase function stored in `m_↔get_capacity_inc_func`.

## Parameters

|                 |                      |
|-----------------|----------------------|
| <i>capacity</i> | the current capacity |
|-----------------|----------------------|

## Returns

the proposed capacity increase

Definition at line 132 of file `dynamic_memory_arrays.hpp`.

#### 8.43.3.2 string uva::utils::containers::mem\_increase\_strategy::get\_strategy\_info ( ) const [inline]

Allows to retrieve the strategy name

## Returns

the strategy name

Definition at line 118 of file `dynamic_memory_arrays.hpp`.

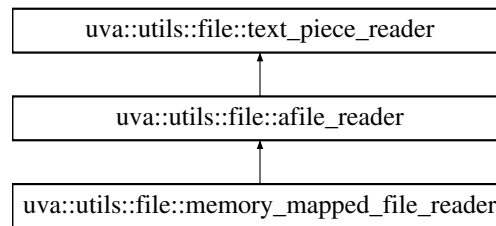
The documentation for this class was generated from the following file:

- [inc/common/utils/containers/dynamic\\_memory\\_arrays.hpp](#)

## 8.44 uva::utils::file::memory\_mapped\_file\_reader Class Reference

```
#include <memory_mapped_file_reader.hpp>
```

Inheritance diagram for `uva::utils::file::memory_mapped_file_reader`:



## Public Member Functions

- [memory\\_mapped\\_file\\_reader](#) (const char \*fileName)
- virtual void [log\\_reader\\_type\\_info](#) ()
- bool [get\\_first\\_line](#) ([text\\_piece\\_reader](#) &out)
- virtual bool [is\\_open](#) () const
- virtual [operator bool](#) () const
- virtual void [close](#) ()

## Additional Inherited Members

### 8.44.1 Detailed Description

This is the file reader for the memory mapped file. It is supposed to provide fast memory reads from large files.

For more information on memory mapped files read: [https://en.wikipedia.org/wiki/Memory-mapped\\_file](https://en.wikipedia.org/wiki/Memory-mapped_file)

A possible benefit of memory-mapped files is a "lazy loading", thus using small amounts of RAM even for a very large file. Trying to load the entire contents of a file that is significantly larger than the amount of memory available can cause severe thrashing as the operating system reads from disk into memory and simultaneously writes pages from memory back to disk. Memory-mapping may not only bypass the page file completely, but the system only needs to load the smaller page-sized sections as data is being edited, similarly to demand paging scheme used for programs.

The memory mapping process is handled by the virtual memory manager, which is the same subsystem responsible for dealing with the page file. Memory mapped files are loaded into memory one entire page at a time. The page size is selected by the operating system for maximum performance. Since page file management is one of the most critical elements of a virtual memory system, loading page sized sections of a file into physical memory is typically a very highly optimized system function.

Here is also some nice explanation from: <http://stackoverflow.com/questions/1972765/mmap-problem-alloc>

Mapping the file into memory is different to actually reading the file into memory. Were you to read it in, you would have to transfer the entire contents into memory. By mapping it, you let the operating system handle it. If you attempt to read or write to a location in that memory area, the OS will load the relevant section for you first. It will not load the entire file unless the entire file is needed.

That is where you get your performance gain. If you map the entire file but only change one byte then unmap it, you'll find that there's not much disk I/O at all.

Of course, if you touch every byte in the file, then yes, it will all be loaded at some point but not necessarily in physical RAM all at once. But that's the case even if you load the entire file up front. The OS will swap out parts of your data if there's not enough physical memory to contain it all, along with that of the other processes in the system.

The main advantages of memory mapping are:

- 1) You defer reading the file sections until they're needed (and, if they're never needed, they don't get loaded). So there's no big upfront cost as you load the entire file. It amortises the cost of loading.

2) The writes are automated, you don't have to write out every byte. Just close it and the OS will write out the changed sections. I think this also happens when the memory is swapped out as well (in low physical memory situations), since your buffer is simply a window onto the file.

Definition at line 103 of file `memory_mapped_file_reader.hpp`.

## 8.44.2 Constructor & Destructor Documentation

**8.44.2.1** `uva::utils::file::memory_mapped_file_reader::memory_mapped_file_reader ( const char * fileName )` `[inline]`

The basic constructor

Parameters

|                 |               |
|-----------------|---------------|
| <i>fileName</i> | the file name |
|-----------------|---------------|

Definition at line 115 of file `memory_mapped_file_reader.hpp`.

## 8.44.3 Member Function Documentation

**8.44.3.1** `virtual void uva::utils::file::memory_mapped_file_reader::close ( )` `[inline]`, `[virtual]`

This method should be used to close the file

Reimplemented from [uva::utils::file::afile\\_reader](#).

Definition at line 183 of file `memory_mapped_file_reader.hpp`.

**8.44.3.2** `bool uva::utils::file::memory_mapped_file_reader::get_first_line ( text_piece_reader & out )` `[inline]`

Definition at line 160 of file `memory_mapped_file_reader.hpp`.

**8.44.3.3** `virtual bool uva::utils::file::memory_mapped_file_reader::is_open ( ) const` `[inline]`, `[virtual]`

This method is used to check if the file was successfully opened.

Returns

true if the file is successfully opened otherwise false.

Implements [uva::utils::file::afile\\_reader](#).

Definition at line 168 of file `memory_mapped_file_reader.hpp`.

**8.44.3.4** `virtual void uva::utils::file::memory_mapped_file_reader::log_reader_type_info ( )` `[inline]`, `[virtual]`

Allows to log the information about the instantiated file reader type

Implements [uva::utils::file::afile\\_reader](#).

Definition at line 156 of file `memory_mapped_file_reader.hpp`.

**8.44.3.5** `virtual uva::utils::file::memory_mapped_file_reader::operator bool ( ) const` `[inline]`, `[explicit]`, `[virtual]`

Checks if the file is present.

**Returns**

true if it is

Implements [uva::utils::file::afile\\_reader](#).

Definition at line 176 of file `memory_mapped_file_reader.hpp`.

The documentation for this class was generated from the following file:

- `inc/common/utls/file/memory_mapped_file_reader.hpp`

## 8.45 uva::utils::monitor::memory\_usage Struct Reference

```
#include <statistics_monitor.hpp>
```

**Public Member Functions**

- [memory\\_usage\(\)](#)

**Public Attributes**

- `int` [vmsize](#)
- `int` [vmpeak](#)
- `int` [vmrss](#)
- `int` [vmhwm](#)

### 8.45.1 Detailed Description

This structure stores the memory statistics. Resident Set Size: number of pages the process has in real memory. This is just the pages which count toward text, data, or stack space. This does not include pages which have not been demand-loaded in, or which are swapped out. For more information see <http://man7.org/linux/man-pages/man5/proc.5.html>

Definition at line 46 of file `statistics_monitor.hpp`.

### 8.45.2 Constructor & Destructor Documentation

8.45.2.1 `uva::utils::monitor::memory_usage::memory_usage( )` `[inline]`

Definition at line 56 of file `statistics_monitor.hpp`.

### 8.45.3 Member Data Documentation

8.45.3.1 `int` `uva::utils::monitor::memory_usage::vmhwm`

Definition at line 54 of file `statistics_monitor.hpp`.

8.45.3.2 `int` `uva::utils::monitor::memory_usage::vmpeak`

Definition at line 50 of file `statistics_monitor.hpp`.

## 8.45.3.3 int uva::utils::monitor::memory\_usage::vmrss

Definition at line 52 of file statistics\_monitor.hpp.

## 8.45.3.4 int uva::utils::monitor::memory\_usage::vmsize

Definition at line 48 of file statistics\_monitor.hpp.

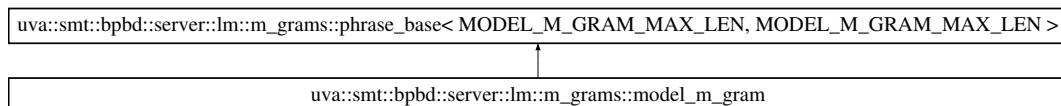
The documentation for this struct was generated from the following file:

- inc/common/utils/monitor/statistics\_monitor.hpp

## 8.46 uva::smt::bpbd::server::lm::m\_grams::model\_m\_gram Class Reference

```
#include <model_m_gram.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::lm::m\_grams::model\_m\_gram:



## Public Types

- typedef [phrase\\_base](#)< MODEL\_M\_GRAM\_MAX\_LEN, MODEL\_M\_GRAM\_MAX\_LEN > [BASE](#)

## Public Member Functions

- [model\\_m\\_gram](#) ([phrase\\_length](#) actual\_level)
- void [start\\_new\\_m\\_gram](#) ()
- [text\\_piece\\_reader](#) & [get\\_next\\_new\\_token](#) ()
- bool [is\\_unk\\_unigram](#) () const
- template<typename WordIndexType >  
void [prepare\\_for\\_adding](#) (WordIndexType &word\_index)
- uint64\_t [get\\_hash](#) () const

## Public Attributes

- [m\\_gram\\_payload](#) [m\\_payload](#)
- [prob\\_weight](#) [m\\_prob](#)
- [prob\\_weight](#) [m\\_back\\_off](#)

## Friends

- ostream & [operator](#)<< (ostream &stream, const [model\\_m\\_gram](#) &gram)

## Additional Inherited Members

### 8.46.1 Detailed Description

This class is used to represent the N-Gram that will be stored into the language model.

Definition at line 57 of file `model_m_gram.hpp`.

### 8.46.2 Member Typedef Documentation

8.46.2.1 `typedef phrase_base<MODEL_M_GRAM_MAX_LEN, MODEL_M_GRAM_MAX_LEN>  
uva::smt::bpbd::server::lm::m_grams::model_m_gram::BASE`

Definition at line 60 of file `model_m_gram.hpp`.

### 8.46.3 Constructor & Destructor Documentation

8.46.3.1 `uva::smt::bpbd::server::lm::m_grams::model_m_gram::model_m_gram ( phrase_length actual_level )  
[inline]`

The basic constructor, is to be used when the M-gram level is known beforehand. Allows to set the actual M-gram level to a concrete value.

Parameters

|                     |                                                                                        |
|---------------------|----------------------------------------------------------------------------------------|
| <i>actual_level</i> | the actual level of the m-gram that will be used should be $\leq$ MODEL_M_GRAM_MAX_LEN |
|---------------------|----------------------------------------------------------------------------------------|

Definition at line 77 of file `model_m_gram.hpp`.

### 8.46.4 Member Function Documentation

8.46.4.1 `uint64_t uva::smt::bpbd::server::lm::m_grams::model_m_gram::get_hash ( ) const [inline]`

Allows to retrieve the hash value for the given m-gram

Returns

the hash value for the given m-gram

Definition at line 163 of file `model_m_gram.hpp`.

8.46.4.2 `text_piece_reader& uva::smt::bpbd::server::lm::m_grams::model_m_gram::get_next_new_token ( )  
[inline]`

Returns the reference to the next new token of the m-gram

Returns

the reference to the next new token of the m-gram

Definition at line 93 of file `model_m_gram.hpp`.

8.46.4.3 `bool uva::smt::bpbd::server::lm::m_grams::model_m_gram::is_unk_unigram ( ) const [inline]`

Allows to detect whether the given m-gram is an `<unk>` unigram.

**Returns**

true if this is an <unk> unigram

Definition at line 105 of file model\_m\_gram.hpp.

**8.46.4.4** `template<typename WordIndexType > void uva::smt::bpbd::server::lm::m_grams::model_m_gram::prepare_for_↵  
adding ( WordIndexType & word_index ) [inline]`

Allows to prepare the M-gram for being used for adding it to the trie This includes registering the one gram in the word index

**Parameters**

|                   |                           |
|-------------------|---------------------------|
| <i>word_index</i> | the word index to be used |
|-------------------|---------------------------|

Definition at line 116 of file model\_m\_gram.hpp.

**8.46.4.5** `void uva::smt::bpbd::server::lm::m_grams::model_m_gram::start_new_m_gram ( ) [inline]`

Allows to start a new M-gram with the given level

**Parameters**

|                   |                                         |
|-------------------|-----------------------------------------|
| <i>CURR_LEVEL</i> | the level of the M-gram we are starting |
|-------------------|-----------------------------------------|

Definition at line 85 of file model\_m\_gram.hpp.

**8.46.5 Friends And Related Function Documentation**

**8.46.5.1** `ostream& operator<< ( ostream & stream, const model_m_gram & gram ) [friend]`

Allows to serialize the m-gram to the output stream as a string

**Parameters**

|               |                                            |
|---------------|--------------------------------------------|
| <i>stream</i> | the reference to the stream to output into |
| <i>gram</i>   | the m-gram object to output                |

**Returns**

the reference to the stream

Definition at line 44 of file model\_m\_gram.cpp.

**8.46.6 Member Data Documentation**

**8.46.6.1** `prob_weight uva::smt::bpbd::server::lm::m_grams::model_m_gram::m_back_off`

Definition at line 69 of file model\_m\_gram.hpp.

**8.46.6.2** `m_gram_payload uva::smt::bpbd::server::lm::m_grams::model_m_gram::m_payload`

Definition at line 63 of file model\_m\_gram.hpp.

### 8.46.6.3 prob\_weight uva::smt::bpbdd::server::lm::m\_grams::model\_m\_gram::m\_prob

Definition at line 66 of file model\_m\_gram.hpp.

The documentation for this class was generated from the following file:

- inc/server/lm/mgrams/model\_m\_gram.hpp

## 8.47 uva::smt::bpbdd::server::decoder::stack::multi\_stack Class Reference

```
#include <multi_stack.hpp>
```

### Public Member Functions

- [multi\\_stack](#) (const [de\\_parameters](#) &params, [acr\\_bool\\_flag](#) is\_stop, const string &source\_sent, const [sentence\\_data\\_map](#) &sent\_data, const [rm\\_query\\_proxy](#) &rm\_query, [lm\\_fast\\_query\\_proxy](#) &lm\_query)
- [~multi\\_stack](#) ()
- void [expand](#) ()
- void [get\\_best\\_trans](#) (string &target\_sent) const

### Protected Member Functions

- void [add\\_stack\\_state](#) ([stack\\_state\\_ptr](#) new\_state)

### 8.47.1 Detailed Description

This is the translation stack class that is responsible for the sentence translation

Definition at line 73 of file multi\_stack.hpp.

### 8.47.2 Constructor & Destructor Documentation

8.47.2.1 uva::smt::bpbdd::server::decoder::stack::multi\_stack::multi\_stack ( const [de\\_parameters](#) & params, [acr\\_bool\\_flag](#) is\_stop, const string & source\_sent, const [sentence\\_data\\_map](#) & sent\_data, const [rm\\_query\\_proxy](#) & rm\_query, [lm\\_fast\\_query\\_proxy](#) & lm\_query ) [\[inline\]](#)

The basic constructor

Parameters

|                    |                                                    |
|--------------------|----------------------------------------------------|
| <i>params</i>      | the decoder parameters, stores the reference to it |
| <i>is_stop</i>     | the stop flag                                      |
| <i>source_sent</i> | the reference to the source sentence               |
| <i>sent_data</i>   | the retrieved sentence data                        |
| <i>rm_query</i>    | the reordering model query                         |
| <i>lm_query</i>    | the language model query object                    |

Definition at line 85 of file multi\_stack.hpp.

8.47.2.2 uva::smt::bpbdd::server::decoder::stack::multi\_stack::~~multi\_stack ( ) [\[inline\]](#)

The basic destructor

Definition at line 121 of file multi\_stack.hpp.



### 8.47.3 Member Function Documentation

8.47.3.1 void uva::smt::bpbd::server::decoder::stack::multi\_stack::add\_stack\_state ( stack\_state\_ptr new\_state )  
[inline], [protected]

Allows to add a new stack state into the proper stack level

Parameters

|                  |                               |
|------------------|-------------------------------|
| <i>new_state</i> | the new stack state, not NULL |
|------------------|-------------------------------|

Definition at line 191 of file multi\_stack.hpp.

8.47.3.2 void uva::smt::bpbd::server::decoder::stack::multi\_stack::expand ( ) [inline]

Allows to extend the hypothesis, when extending the stack we immediately re-combine

Definition at line 141 of file multi\_stack.hpp.

8.47.3.3 void uva::smt::bpbd::server::decoder::stack::multi\_stack::get\_best\_trans ( string & target\_sent ) const [inline]

Allows to get the best translation from the stack after the decoding has finished.

Parameters

|                    |                                             |
|--------------------|---------------------------------------------|
| <i>target_sent</i> | [out] the variable to store the translation |
|--------------------|---------------------------------------------|

Definition at line 172 of file multi\_stack.hpp.

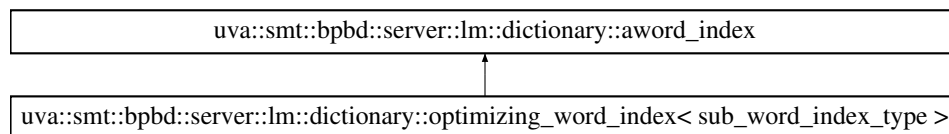
The documentation for this class was generated from the following file:

- inc/server/decoder/stack/multi\_stack.hpp

## 8.48 uva::smt::bpbd::server::lm::dictionary::optimizing\_word\_index< sub\_word\_index\_type > Class Template Reference

```
#include <optimizing_word_index.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::lm::dictionary::optimizing\_word\_index< sub\_word\_index\_type >:



### Public Member Functions

- [optimizing\\_word\\_index](#) (const float memory\_factor)
- void [reserve](#) (const size\_t num\_words)
- size\_t [get\\_number\\_of\\_words](#) (const size\_t num\_words) const
- [word\\_uid](#) [get\\_word\\_id](#) (const [text\\_piece\\_reader](#) &token) const
- bool [is\\_word\\_registering\\_needed](#) () const
- [word\\_uid](#) [register\\_word](#) (const [text\\_piece\\_reader](#) &token)
- bool [is\\_word\\_counts\\_needed](#) () const
- void [count\\_word](#) (const [text\\_piece\\_reader](#) &word, [prob\\_weight](#) prob)

- void `do_post_word_count` ()
- bool `is_post_actions_needed` () const
- void `do_post_actions` ()
- virtual `~optimizing_word_index` ()

## Static Public Member Functions

- static constexpr bool `is_word_index_continuous` ()

### 8.48.1 Detailed Description

```
template<typename sub_word_index_type>class uva::smt::bpbd::server::lm::dictionary::optimizing_word_index< sub_word↵
_index_type >
```

This class is to be used as an optimizer wrapped around the original index. The main idea is that a word index is provided to this class and is used for initial data gathering. After that is done, during the post actions the data from the original word index is taken and converted into optimized format. This data is then stored within this class. The original word index is then destroyed to save space.

#### Parameters

|                                  |                                   |
|----------------------------------|-----------------------------------|
| <i>sub_word_↵<br/>index_type</i> | the sub WordIndex type to be used |
|----------------------------------|-----------------------------------|

Definition at line 85 of file `optimizing_word_index.hpp`.

### 8.48.2 Constructor & Destructor Documentation

8.48.2.1 `template<typename sub_word_index_type > uva::smt::bpbd::server::lm::dictionary::optimizing_↵  
_word_index< sub_word_index_type >::optimizing_word_index ( const float memory_factor )`  
[inline]

This is the main constructor to be used. It accepts ther disposable word index. Which will be destroyed by this class at any needed moment, so no one else must have a reference or a pointer to the argument object

#### Parameters

|                      |                                                        |
|----------------------|--------------------------------------------------------|
| <i>memory_factor</i> | the memory factor for the SubWordIndexType constructor |
|----------------------|--------------------------------------------------------|

Definition at line 94 of file `optimizing_word_index.hpp`.

8.48.2.2 `template<typename sub_word_index_type > virtual uva::smt::bpbd::server::lm::dictionary↵  
::optimizing_word_index< sub_word_index_type >::~~optimizing_word_index ( ) [inline],`  
[virtual]

The basic destructor

Definition at line 255 of file `optimizing_word_index.hpp`.

### 8.48.3 Member Function Documentation

8.48.3.1 `template<typename sub_word_index_type > void uva::smt::bpbd::server::lm::dictionary::optimizing_↵  
word_index< sub_word_index_type >::count_word ( const text_piece_reader & word, prob_weight prob )`  
[inline]

This method is to be used when the word counting is needed.

See also

AWordIndex

Definition at line 196 of file optimizing\_word\_index.hpp.

```
8.48.3.2 template<typename sub_word_index_type > void uva::smt::bpbd::server::lm↵
::dictionary::optimizing_word_index< sub_word_index_type >::do_post_actions ()
[inline]
```

Is to be called if the post actions are needed right after that all the individual words have been added into the index.

See also

AWordIndex

Definition at line 224 of file optimizing\_word\_index.hpp.

```
8.48.3.3 template<typename sub_word_index_type > void uva::smt::bpbd::server::lm↵
::dictionary::optimizing_word_index< sub_word_index_type >::do_post_word_count ()
[inline]
```

Should be called if the word count is needed after all the words have been counted.

See also

AWordIndex

Definition at line 205 of file optimizing\_word\_index.hpp.

```
8.48.3.4 template<typename sub_word_index_type > size_t uva::smt::bpbd::server::lm::dictionary↵
::optimizing_word_index< sub_word_index_type >::get_number_of_words (const size_t num_words) const
[inline]
```

Allows to get the total words count including the unknown and undefined words

See also

AWordIndex

Definition at line 129 of file optimizing\_word\_index.hpp.

```
8.48.3.5 template<typename sub_word_index_type > word_uid uva::smt::bpbd::server::lm::dictionary↵
::optimizing_word_index< sub_word_index_type >::get_word_id (const text_piece_reader & token) const
[inline]
```

This function gets an id for the given word word based on the stored 1-Grams.

See also

AWordIndex

Definition at line 146 of file optimizing\_word\_index.hpp.

```
8.48.3.6 template<typename sub_word_index_type > bool uva::smt::bpbd::server::lm::dictionary↵
 ::optimizing_word_index< sub_word_index_type >::is_post_actions_needed () const
 [inline]
```

Indicates if the post-actions are needed. The post actions should be called after all the words have been filled into the index.

See also

[AWordIndex](#)

Definition at line 215 of file `optimizing_word_index.hpp`.

```
8.48.3.7 template<typename sub_word_index_type > bool uva::smt::bpbd::server::lm::dictionary↵
 ::optimizing_word_index< sub_word_index_type >::is_word_counts_needed () const
 [inline]
```

This method allows to indicate whether word counting is needed by the given implementation of the word index.

See also

[AWordIndex](#)

Definition at line 188 of file `optimizing_word_index.hpp`.

```
8.48.3.8 template<typename sub_word_index_type > static constexpr bool uva::smt::bpbd::server::lm::dictionary↵
 ::optimizing_word_index< sub_word_index_type >::is_word_index_continuous () [inline],
 [static]
```

Allows to indicate if the word index is continuous, i.e. it issues the word ids in a continuous range starting from 0.

See also

[AWordIndex](#)

Returns

true - this word index is continuous.

Definition at line 248 of file `optimizing_word_index.hpp`.

```
8.48.3.9 template<typename sub_word_index_type > bool uva::smt::bpbd::server::lm::dictionary↵
 ::optimizing_word_index< sub_word_index_type >::is_word_registering_needed () const
 [inline]
```

This method allows to indicate whether registering a word is needed by the given implementation of the word index.

See also

[AWordIndex](#)

Definition at line 171 of file `optimizing_word_index.hpp`.

```
8.48.3.10 template<typename sub_word_index_type > word_uid uva::smt::bpbd::server::lm::dictionary↵
 ::optimizing_word_index< sub_word_index_type >::register_word (const text_piece_reader & token)
 [inline]
```

This function creates/gets an id for the given word.

See also

`AWordIndex`

Definition at line 179 of file `optimizing_word_index.hpp`.

```
8.48.3.11 template<typename sub_word_index_type > void uva::smt::bpbd::server::lm::dictionary↵
 ::optimizing_word_index< sub_word_index_type >::reserve (const size_t num_words)
 [inline]
```

This method should be used to pre-allocate the word index

Parameters

|                        |                     |
|------------------------|---------------------|
| <code>num_words</code> | the number of words |
|------------------------|---------------------|

Definition at line 105 of file `optimizing_word_index.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/lm/dictionaries/optimizing_word_index.hpp`

## 8.49 `uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH, MAX_PHRASE_ID_LENGTH >` Class Template Reference

```
#include <m_gram_payload.hpp>
```

### Public Types

- typedef `Byte_M_Gram_Id< word_uid > m_gram_id_type`

### Public Member Functions

- `phrase_base (word_uid *word_ids, phrase_length actual_level)`
- `phrase_base ()`
- `phrase_length get_num_words () const`
- `word_uid get_last_word_id () const`
- `phrase_length get_first_word_idx () const`
- `phrase_length get_last_word_idx () const`
- `const word_uid * word_ids () const`
- `word_uid operator[] (const phrase_length word_idx) const`
- `uint8_t create_phrase_id (const phrase_length begin_word_idx, const phrase_length number_of_words, T↵  
M_Gram_Id_Value_Ptr &p_m_gram_id) const`
- `const TM_Gram_Id_Value_Ptr get_phrase_id_ref (const phrase_length begin_word_idx, const phrase_length  
number_of_words, uint8_t &len_bytes)`

### Protected Member Functions

- void `set_word_ids (const phrase_length num_words, const word_uid *word_ids)`

### 8.49.1 Detailed Description

```
template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>class uva::smt::bpbd::server<
::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH, MAX_PHRASE_ID_LENGTH >
```

This class is the base class for all the M-gram classes used

Definition at line 86 of file m\_gram\_payload.hpp.

### 8.49.2 Member Typedef Documentation

```
8.49.2.1 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH> typedef
Byte_M_Gram_Id<word_uid> uva::smt::bpbd::server::lm::m_grams::phrase_base<
MAX_PHRASE_LENGTH, MAX_PHRASE_ID_LENGTH >::m_gram_id_type
```

Definition at line 89 of file m\_gram\_payload.hpp.

### 8.49.3 Constructor & Destructor Documentation

```
8.49.3.1 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH> uva::smt<
::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH, MAX_PHRASE_ID_LENGTH
>::phrase_base (word_uid * word_ids, phrase_length actual_level) [inline]
```

The basic constructor, is to be used when the M-gram level is known beforehand. Allows to set the actual M-gram level to a concrete value.

Parameters

|                     |                                                                                                                                                           |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>word_ids</i>     | the pointer to the word ids array to store NOTE: this pointer must remain through out the lifetime of the object, unless re-set by the appropriate method |
| <i>actual_level</i> | the actual level of the m-gram that will be used should be $\leq$ M_GRAM_LENGTH                                                                           |

Definition at line 100 of file m\_gram\_payload.hpp.

```
8.49.3.2 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>
uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH,
MAX_PHRASE_ID_LENGTH >::phrase_base () [inline]
```

The basic constructor, is to be used when the phrase will actual level is not known beforehand - used e.g. in the query m-gram sub-class. The actual m-gram level is set to be undefined. Filling in the phrase tokens is done elsewhere.

Parameters

|                   |                     |
|-------------------|---------------------|
| <i>word_index</i> | the used word index |
|-------------------|---------------------|

Definition at line 120 of file m\_gram\_payload.hpp.

### 8.49.4 Member Function Documentation

```
8.49.4.1 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>
uint8_t uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH,
MAX_PHRASE_ID_LENGTH >::create_phrase_id (const phrase_length begin_word_idx, const phrase_length
number_of_words, TM_Gram_Id_Value_Ptr & p_m_gram_id) const [inline]
```

Allows to create a new m-gram id for the sub-hrase defined by the given of the method template parameters. For the argument reference to the id data pointer the following holds: a) If there was no memory allocated for the M-gram

id then there will be allocated as much as needed to store the given id. b) If there was memory allocated then no re-allocation will be done, then it is assumed that enough memory was allocated

## Parameters

|                          |                                                                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>begin_word_idx</i>    | the index of the first word in the sub-m-gram, indexes start with 0                                                                                                 |
| <i>number_of ↵ words</i> | the number of sub-m-gram words                                                                                                                                      |
| <i>word_ids</i>          | the list of the word ids for the entire m-gram, where at least the m-gram word ids for the sub-m-gram defined by the template parameters are known and initialized. |
| <i>p_m_gram_id</i>       | the reference to the M-gram id data pointer to be initialized with the M-gram id data, must be pre-allocated                                                        |

Definition at line 192 of file m\_gram\_payload.hpp.

```
8.49.4.2 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>
 phrase_length uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH,
 MAX_PHRASE_ID_LENGTH >::get_first_word_idx () const [inline]
```

Allows to retrieve the actual begin word index

## Returns

the index of the begin word

Definition at line 146 of file m\_gram\_payload.hpp.

```
8.49.4.3 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>
 word_uid uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH,
 MAX_PHRASE_ID_LENGTH >::get_last_word_id () const [inline]
```

Allows to retrieve the actual end word id of the m-gram

## Returns

the id of the last word

Definition at line 138 of file m\_gram\_payload.hpp.

```
8.49.4.4 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>
 phrase_length uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH,
 MAX_PHRASE_ID_LENGTH >::get_last_word_idx () const [inline]
```

Allows to retrieve the actual end word index

## Returns

the index of the end word

Definition at line 154 of file m\_gram\_payload.hpp.

```
8.49.4.5 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>
 phrase_length uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH,
 MAX_PHRASE_ID_LENGTH >::get_num_words () const [inline]
```

Allows to obtain the actual m-gram level

## Returns

the actual m-gram level

Definition at line 130 of file m\_gram\_payload.hpp.



```
8.49.4.6 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>
 const TM_Gram_Id_Value_Ptr uva::smt::bpbd::server::lm::m_grams::phrase_base<
 MAX_PHRASE_LENGTH, MAX_PHRASE_ID_LENGTH >::get_phrase_id_ref (const phrase_length begin_word_idx,
 const phrase_length number_of_words, uint8_t & len_bytes) [inline]
```

Allows to create a new m-gram id for the sub-phrase defined by the given of the method template parameters. For the argument reference to the id data pointer the following holds: a) If there was no memory allocated for the M-gram id then there will be allocated as much as needed to store the given id. b) If there was memory allocated then no re-allocation will be done, then it is assumed that enough memory was allocated

#### Parameters

|                        |                                                                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>begin_word_idx</i>  | the index of the first word in the sub-m-gram, indexes start with 0                                                                                                 |
| <i>number_of_words</i> | the number of sub-m-gram words                                                                                                                                      |
| <i>word_ids</i>        | the list of the word ids for the entire m-gram, where at least the m-gram word ids for the sub-m-gram defined by the template parameters are known and initialized. |
| <i>p_m_gram_id</i>     | the reference to the M-gram id data pointer to be initialized with the M-gram id data, must be pre-allocated                                                        |

Definition at line 225 of file m\_gram\_payload.hpp.

```
8.49.4.7 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>
 word_uid uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH,
 MAX_PHRASE_ID_LENGTH >::operator[] (const phrase_length word_idx) const [inline]
```

Allows get the word id for the given word index

#### Parameters

|                 |                |
|-----------------|----------------|
| <i>word_idx</i> | the word index |
|-----------------|----------------|

#### Returns

the word id

Definition at line 172 of file m\_gram\_payload.hpp.

```
8.49.4.8 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH>
 void uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH,
 MAX_PHRASE_ID_LENGTH >::set_word_ids (const phrase_length num_words, const word_uid * word_ids)
 [inline], [protected]
```

Allows to set the pointer to the word ids

#### Parameters

|                  |                                  |
|------------------|----------------------------------|
| <i>word_ids</i>  | the pointer to the void ids      |
| <i>num_words</i> | the number of words in the array |

Definition at line 252 of file m\_gram\_payload.hpp.

```
8.49.4.9 template<phrase_length MAX_PHRASE_LENGTH, phrase_length MAX_PHRASE_ID_LENGTH> const
 word_uid* uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH,
 MAX_PHRASE_ID_LENGTH >::word_ids () const [inline]
```

Allows to work with the list of ids as with the continuous array. This function retrieves the pointer to the last word id of the m-gram.

**Returns**

the pointer to the first word id element,

Definition at line 163 of file `m_gram_payload.hpp`.

The documentation for this class was generated from the following file:

- [inc/server/lm/mgrams/m\\_gram\\_payload.hpp](#)

## 8.50 `uva::smt::bpbd::server::decoder::sentence::phrase_data_entry` Struct Reference

```
#include <sentence_data_map.hpp>
```

**Public Member Functions**

- [phrase\\_data\\_entry\(\)](#)
- [~phrase\\_data\\_entry\(\)](#)

**Public Attributes**

- `uint32_t` [m\\_begin\\_ch\\_idx](#)
- `uint32_t` [m\\_end\\_ch\\_idx](#)
- `phrase_uid` [m\\_phrase\\_uid](#)
- `tm_const_source_entry_ptr` [m\\_source\\_entry](#)
- `prob_weight` [future\\_cost](#)

### 8.50.1 Detailed Description

This structure stores the source phrase information data. This data is the begin and end character position of the phrase in the original sentence, also the first and the last word indexes, the phrase id and the available translation, i.e. source entry.

Definition at line 67 of file `sentence_data_map.hpp`.

### 8.50.2 Constructor & Destructor Documentation

**8.50.2.1** `uva::smt::bpbd::server::decoder::sentence::phrase_data_entry::phrase_data_entry( )` `[inline]`

The basic constructor, does default initialization of the structure fields

Definition at line 72 of file `sentence_data_map.hpp`.

**8.50.2.2** `uva::smt::bpbd::server::decoder::sentence::phrase_data_entry::~~phrase_data_entry( )` `[inline]`

The basic destructor

Definition at line 80 of file `sentence_data_map.hpp`.

### 8.50.3 Member Data Documentation

**8.50.3.1** `prob_weight` `uva::smt::bpbd::server::decoder::sentence::phrase_data_entry::future_cost`

Definition at line 95 of file `sentence_data_map.hpp`.

## 8.50.3.2 uint32\_t uva::smt::bpbd::server::decoder::sentence::phrase\_data\_entry::m\_begin\_ch\_idx

Definition at line 84 of file sentence\_data\_map.hpp.

## 8.50.3.3 uint32\_t uva::smt::bpbd::server::decoder::sentence::phrase\_data\_entry::m\_end\_ch\_idx

Definition at line 86 of file sentence\_data\_map.hpp.

## 8.50.3.4 phrase\_uid uva::smt::bpbd::server::decoder::sentence::phrase\_data\_entry::m\_phrase\_uid

Definition at line 89 of file sentence\_data\_map.hpp.

## 8.50.3.5 tm\_const\_source\_entry\_ptr uva::smt::bpbd::server::decoder::sentence::phrase\_data\_entry::m\_source\_entry

Definition at line 92 of file sentence\_data\_map.hpp.

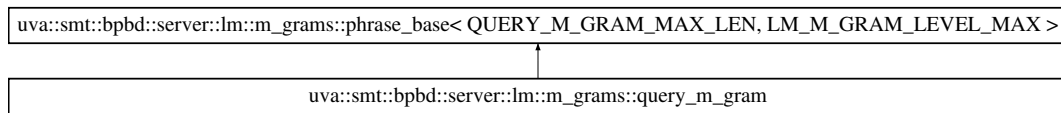
The documentation for this struct was generated from the following file:

- inc/server/decoder/sentence/[sentence\\_data\\_map.hpp](#)

## 8.51 uva::smt::bpbd::server::lm::m\_grams::query\_m\_gram Class Reference

```
#include <query_m_gram.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::lm::m\_grams::query\_m\_gram:



## Public Types

- typedef [phrase\\_base](#)< QUERY\_M\_GRAM\_MAX\_LEN, LM\_M\_GRAM\_LEVEL\_MAX > [BASE](#)

## Public Member Functions

- [query\\_m\\_gram](#) ()
- uint64\_t [get\\_hash](#) ([phrase\\_length](#) begin\_word\_idx, const [phrase\\_length](#) end\_word\_idx) const
- void [set\\_m\\_gram](#) (const [phrase\\_length](#) num\_words, const [word\\_uid](#) \*[word\\_ids](#))

## Friends

- ostream & [operator<<](#) (ostream &stream, const [query\\_m\\_gram](#) &gram)

## Additional Inherited Members

## 8.51.1 Detailed Description

This class is used to represent the N-Gram that will be queried against the language model.

Definition at line 56 of file query\_m\_gram.hpp.

## 8.51.2 Member Typedef Documentation

8.51.2.1 `typedef phrase_base<QUERY_M_GRAM_MAX_LEN, LM_M_GRAM_LEVEL_MAX>  
uva::smt::bpbd::server::lm::m_grams::query_m_gram::BASE`

Definition at line 59 of file `query_m_gram.hpp`.

## 8.51.3 Constructor & Destructor Documentation

8.51.3.1 `uva::smt::bpbd::server::lm::m_grams::query_m_gram::query_m_gram ( ) [inline]`

The basic constructor, is to be used when the M-gram will actual level is not known beforehand - used e.g. in the query m-gram sub-class. The actual m-gram level is set to be undefined. Filling in the M-gram tokens is done elsewhere.

Parameters

|                   |                     |
|-------------------|---------------------|
| <i>word_index</i> | the used word index |
|-------------------|---------------------|

Definition at line 68 of file `query_m_gram.hpp`.

## 8.51.4 Member Function Documentation

8.51.4.1 `uint64_t uva::smt::bpbd::server::lm::m_grams::query_m_gram::get_hash ( phrase_length begin_word_idx, const  
phrase_length end_word_idx ) const [inline]`

Allows to retrieve the hash value for the sub-m-gram defined by the parameters

Parameters

|                       |                                        |
|-----------------------|----------------------------------------|
| <i>begin_word_idx</i> | the begin word index of the sub-m-gram |
| <i>end_word_idx</i>   | the end word index of the sub-m-gram   |

Returns

the hash value for the given sub-m-gram

Definition at line 78 of file `query_m_gram.hpp`.

8.51.4.2 `void uva::smt::bpbd::server::lm::m_grams::query_m_gram::set_m_gram ( const phrase_length num_words, const  
word_uid * word_ids ) [inline]`

Tokenise a given piece of text into a space separated list of text pieces.

Parameters

|             |                                     |
|-------------|-------------------------------------|
| <i>text</i> | the piece of text to tokenise       |
| <i>gram</i> | the gram container to put data into |

Definition at line 137 of file `query_m_gram.hpp`.

## 8.51.5 Friends And Related Function Documentation

8.51.5.1 `ostream& operator<< ( ostream & stream, const query_m_gram & gram ) [friend]`

Allows to serialize the m-gram to the output stream as a string

## Parameters

|               |                                            |
|---------------|--------------------------------------------|
| <i>stream</i> | the reference to the stream to output into |
| <i>gram</i>   | the m-gram object to output                |

## Returns

the reference to the stream

Definition at line 44 of file `query_m_gram.cpp`.

The documentation for this class was generated from the following file:

- [inc/server/lm/mgrams/query\\_m\\_gram.hpp](#)

## 8.52 `uva::utils::containers::alloc::greedy_memory_allocator< T >::rebind< U >` Struct Template Reference

```
#include <greedy_memory_allocator.hpp>
```

## Public Types

- typedef [greedy\\_memory\\_allocator< U >](#) `other`

### 8.52.1 Detailed Description

```
template<typename T>template<typename U>struct uva::utils::containers::alloc::greedy_memory_allocator< T >::rebind< U >
```

Definition at line 144 of file `greedy_memory_allocator.hpp`.

### 8.52.2 Member Typedef Documentation

8.52.2.1 `template<typename T> template<typename U > typedef greedy_memory_allocator<U> uva::utils::containers::alloc::greedy_memory_allocator< T >::rebind< U >::other`

Definition at line 145 of file `greedy_memory_allocator.hpp`.

The documentation for this struct was generated from the following file:

- [inc/common/utils/containers/greedy\\_memory\\_allocator.hpp](#)

## 8.53 `uva::smt::bpbd::server::rm::builders::rm_basic_builder< model_type, reader_type >` Class Template Reference

```
#include <rm_basic_builder.hpp>
```

## Public Member Functions

- [rm\\_basic\\_builder](#) (const [rm\\_parameters](#) &params, model\_type &model, reader\_type &reader)
- void [build](#) ()

## Protected Member Functions

- void [process\\_entry\\_weights](#) (text\_piece\_reader &rest, [rm\\_entry](#) &entry)
- template<bool count\_or\_build>  
void [parse\\_rm\\_file](#) (tm\_query\_proxy &query)
- void [count\\_source\\_target\\_phrases](#) (tm\_query\_proxy &query)
- void [process\\_source\\_entries](#) (tm\_query\_proxy &query)

### 8.53.1 Detailed Description

template<typename model\_type, typename reader\_type>class uva::smt::bpbd::server::rm::builders::rm\_basic\_builder<model\_type, reader\_type >

This class represents a basic reader of the reordering model. It allows to read a text-formatted reordering model and to put it into the given instance of the model class. It assumes the simple text model format as used by Oyster or Moses. See <http://www.statmt.org/moses/?n=Moses.Tutorial> for some info. The reordering model is also commonly known as a phrase table.

Definition at line 75 of file rm\_basic\_builder.hpp.

### 8.53.2 Constructor & Destructor Documentation

8.53.2.1 template<typename model\_type , typename reader\_type > uva::smt::bpbd::server::rm::builders::rm↵  
\_basic\_builder< model\_type, reader\_type >::rm\_basic\_builder ( const rm\_parameters & params,  
model\_type & model, reader\_type & reader ) [inline]

The basic constructor of the builder object params the model parameters

Parameters

|               |                                  |
|---------------|----------------------------------|
| <i>model</i>  | the model to put the data into   |
| <i>reader</i> | the reader to read the data from |

Definition at line 84 of file rm\_basic\_builder.hpp.

### 8.53.3 Member Function Documentation

8.53.3.1 template<typename model\_type , typename reader\_type > void uva::smt::bpbd↵  
::server::rm::builders::rm\_basic\_builder< model\_type, reader\_type >::build ( )  
[inline]

Allows to build the model by reading from the reader object. This is a two step process as first we need the number of distinct source phrases.

Definition at line 93 of file rm\_basic\_builder.hpp.

8.53.3.2 template<typename model\_type , typename reader\_type > void uva::smt::bpbd::server::rm::builders::rm↵  
\_basic\_builder< model\_type, reader\_type >::count\_source\_target\_phrases ( tm\_query\_proxy & query )  
[inline], [protected]

Allows to count and set the number of source phrases

Parameters

|                       |                                                                                       |
|-----------------------|---------------------------------------------------------------------------------------|
| <i>count_or_build</i> | if true then we do count entries if false then we do build be model                   |
| <i>query</i>          | the translation model query object to query the translation model for present entries |

Definition at line 232 of file rm\_basic\_builder.hpp.

```
8.53.3.3 template<typename model_type , typename reader_type > template<bool count_or_build> void
 uva::smt::bpbd::server::rm::builders::rm_basic_builder< model_type, reader_type >::parse_rm_file (
 tm_query_proxy & query) [inline], [protected]
```

Allows to parse the RM model file and do two things depending on the value of the template parameter:

1. Count the number of valid entries
2. Build the RM model NOTE: This two pass parsing is not optimal but we have to do it as we need to know the number of valid entries beforehand, an optimization might be needed!

Parameters

|                       |                                                     |
|-----------------------|-----------------------------------------------------|
| <i>count_or_build</i> | if true then count if false then build              |
| <i>query</i>          | the TM query to check if the source/taret are known |

Definition at line 146 of file rm\_basic\_builder.hpp.

```
8.53.3.4 template<typename model_type , typename reader_type > void uva::smt::bpbd::server::rm::builders::rm_↵
 basic_builder< model_type, reader_type >::process_entry_weights (text_piece_reader & rest, rm_entry &
 entry) [inline], [protected]
```

Allows to parse the reordering weights and set them into the reordering entry

Parameters

|              |                                            |
|--------------|--------------------------------------------|
| <i>rest</i>  | the line to be parsed, starts with a space |
| <i>entry</i> | the entry to put the values into           |

Definition at line 116 of file rm\_basic\_builder.hpp.

```
8.53.3.5 template<typename model_type , typename reader_type > void uva::smt::bpbd::server::rm::builders↵
 ::rm_basic_builder< model_type, reader_type >::process_source_entries (tm_query_proxy & query)
 [inline], [protected]
```

Allows to process translations.

Parameters

|              |                                                                                       |
|--------------|---------------------------------------------------------------------------------------|
| <i>query</i> | the translation model query object to query the translation model for present entries |
|--------------|---------------------------------------------------------------------------------------|

Definition at line 255 of file rm\_basic\_builder.hpp.

The documentation for this class was generated from the following file:

- [inc/server/rm/builders/rm\\_basic\\_builder.hpp](#)

## 8.54 uva::smt::bpbd::server::rm::models::rm\_basic\_model Class Reference

```
#include <rm_basic_model.hpp>
```

### Public Types

- typedef [fixed\\_size\\_hashmap](#)< [rm\\_entry](#), const [phrase\\_uid](#) & > [rm\\_entry\\_map](#)

## Public Member Functions

- [rm\\_basic\\_model](#) ()
- [~rm\\_basic\\_model](#) ()
- bool [is\\_num\\_entries\\_needed](#) () const
- void [set\\_num\\_entries](#) (size\_t num\_entries)
- [rm\\_entry](#) & [add\\_entry](#) (const [phrase\\_uid](#) &source\_uid, const [phrase\\_uid](#) &target\_uid)
- void [find\\_unk\\_entry](#) ()
- void [find\\_begin\\_end\\_entries](#) ()
- const [rm\\_entry](#) \* [get\\_begin\\_tag\\_entry](#) () const
- const [rm\\_entry](#) \* [get\\_end\\_tag\\_entry](#) () const
- bool [is\\_unk\\_entry](#) (const [rm\\_entry](#) \*entry) const
- const [rm\\_entry](#) \* [get\\_entry](#) (const [phrase\\_uid](#) uid) const
- const [rm\\_entry](#) \* [get\\_entry](#) (const [phrase\\_uid](#) &source\_uid, const [phrase\\_uid](#) &target\_uid) const
- void [log\\_model\\_type\\_info](#) ()

## Public Attributes

- const [phrase\\_uid](#) SOURCE\_UNK\_UID
- const [phrase\\_uid](#) TARGET\_UNK\_UID
- const [phrase\\_uid](#) BEGIN\_SENT\_TAG\_UID
- const [phrase\\_uid](#) END\_SENT\_TAG\_UID

### 8.54.1 Detailed Description

This class represents a basic reordering model implementation. The basic model is based on the fixed size hash map which is a self-implemented linear probing hash map also used in several tries. This basic model also does not store the phrases as is but rather the hash values thereof. So it is a hash based implementation which reduces memory but might occasionally result in collisions, the latter is not checked.

Definition at line 62 of file `rm_basic_model.hpp`.

### 8.54.2 Member Typedef Documentation

8.54.2.1 `typedef fixed_size_hashmap<rm_entry, const phrase_uid > uva::smt::bpbd::server::rm::models::rm_basic_model::rm_entry_map`↩

Definition at line 74 of file `rm_basic_model.hpp`.

### 8.54.3 Constructor & Destructor Documentation

8.54.3.1 `uva::smt::bpbd::server::rm::models::rm_basic_model::rm_basic_model ( ) [inline]`

The basic class constructor

Definition at line 79 of file `rm_basic_model.hpp`.

8.54.3.2 `uva::smt::bpbd::server::rm::models::rm_basic_model::~~rm_basic_model ( ) [inline]`

The basic destructor

Definition at line 94 of file `rm_basic_model.hpp`.



#### 8.54.4 Member Function Documentation

8.54.4.1 `rm_entry& uva::smt::bpbd::server::rm::models::rm_basic_model::add_entry ( const phrase_uid & source_uid, const phrase_uid & target_uid ) [inline]`

Allows to add a new reordering entry to the model

## Parameters

|                   |                       |
|-------------------|-----------------------|
| <i>source_uid</i> | the source phrase uid |
| <i>target_uid</i> | the target phrase uid |

## Returns

the reference to the newly allocated entry

Definition at line 129 of file `rm_basic_model.hpp`.

**8.54.4.2** `void uva::smt::bpbd::server::rm::models::rm_basic_model::find_begin_end_entries ( ) [inline]`

Allows to get the reordering model entry for the given tag

## Parameters

|                  |                                                              |
|------------------|--------------------------------------------------------------|
| <i>tag</i>       | the tag to get the reordering entry for                      |
| <i>tag_entry</i> | [out] the reordering model entry pointer reference to be set |

Definition at line 163 of file `rm_basic_model.hpp`.

**8.54.4.3** `void uva::smt::bpbd::server::rm::models::rm_basic_model::find_unk_entry ( ) [inline]`

This method must be called after the model is loaded in order to find the UNK/UNK phrase entry

Definition at line 146 of file `rm_basic_model.hpp`.

**8.54.4.4** `const rm_entry* uva::smt::bpbd::server::rm::models::rm_basic_model::get_begin_tag_entry ( ) const [inline]`

Allows to get the sentence begin tag entry if found

## Returns

the sentence begin tag entry if found or NULL

Definition at line 185 of file `rm_basic_model.hpp`.

**8.54.4.5** `const rm_entry* uva::smt::bpbd::server::rm::models::rm_basic_model::get_end_tag_entry ( ) const [inline]`

Allows to get the sentence end tag entry if found

## Returns

the sentence end tag entry if found or NULL

Definition at line 193 of file `rm_basic_model.hpp`.

**8.54.4.6** `const rm_entry* uva::smt::bpbd::server::rm::models::rm_basic_model::get_entry ( const phrase_uid uid ) const [inline]`

Allows to get the reordering entry for the given source/target pair the latter is identified with a phrase id. In case the entry is not present we return the data for the UNK/UNK pair.

## Parameters

|            |                                   |
|------------|-----------------------------------|
| <i>uid</i> | the source/target phrase pair uid |
|------------|-----------------------------------|

## Returns

the reordering entry, always NOT NULL!

Definition at line 213 of file rm\_basic\_model.hpp.

**8.54.4.7** `const rm_entry* uva::smt::bpbd::server::rm::models::rm_basic_model::get_entry ( const phrase_uid & source_uid, const phrase_uid & target_uid ) const [inline]`

Allows to get the reordering entry for the given source/target pair In case the entry is not present we return the data for the UNK/UNK pair.

## Parameters

|                   |                       |
|-------------------|-----------------------|
| <i>source_uid</i> | the source phrase uid |
| <i>target_uid</i> | the target phrase uid |

## Returns

the reordering entry, always NOT NULL!

Definition at line 237 of file rm\_basic\_model.hpp.

**8.54.4.8** `bool uva::smt::bpbd::server::rm::models::rm_basic_model::is_num_entries_needed ( ) const [inline]`

This method allows to detect if the number of reordering entries is needed before the entries are being added.

## Returns

true as this model type uses fixed-size hash maps

Definition at line 108 of file rm\_basic\_model.hpp.

**8.54.4.9** `bool uva::smt::bpbd::server::rm::models::rm_basic_model::is_unk_entry ( const rm_entry * entry ) const [inline]`

Allows to detect whether the given entry is an entry for the unknown phrase pair

## Parameters

|              |                                                                  |
|--------------|------------------------------------------------------------------|
| <i>entry</i> | the entry pointer to be checked for being from the UNK/UNK entry |
|--------------|------------------------------------------------------------------|

## Returns

true if this entry is for the unknown phrase pair, otherwise false

Definition at line 202 of file rm\_basic\_model.hpp.

**8.54.4.10** `void uva::smt::bpbd::server::rm::models::rm_basic_model::log_model_type_info ( ) [inline]`

Allows to log the model type info

Definition at line 248 of file rm\_basic\_model.hpp.

8.54.4.11 `void uva::smt::bpbd::server::rm::models::rm_basic_model::set_num_entries ( size_t num_entries ) [inline]`

This method is needed to set the number of reordering entries in the model.

## Parameters

|                    |                                               |
|--------------------|-----------------------------------------------|
| <i>num_entries</i> | the number of entries in the reordering model |
|--------------------|-----------------------------------------------|

Definition at line 116 of file `rm_basic_model.hpp`.

### 8.54.5 Member Data Documentation

#### 8.54.5.1 `const phrase_uid uva::smt::bpbd::server::rm::models::rm_basic_model::BEGIN_SENT_TAG_UID`

Definition at line 69 of file `rm_basic_model.hpp`.

#### 8.54.5.2 `const phrase_uid uva::smt::bpbd::server::rm::models::rm_basic_model::END_SENT_TAG_UID`

Definition at line 71 of file `rm_basic_model.hpp`.

#### 8.54.5.3 `const phrase_uid uva::smt::bpbd::server::rm::models::rm_basic_model::SOURCE_UNK_UID`

Definition at line 65 of file `rm_basic_model.hpp`.

#### 8.54.5.4 `const phrase_uid uva::smt::bpbd::server::rm::models::rm_basic_model::TARGET_UNK_UID`

Definition at line 67 of file `rm_basic_model.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/rm/models/rm_basic_model.hpp`

## 8.55 uva::smt::bpbd::server::rm::rm\_configurator Class Reference

```
#include <rm_configurator.hpp>
```

### Static Public Member Functions

- static void `connect` (const `rm_parameters` &params)
- static void `disconnect` ()
- static `rm_query_proxy` & `allocate_query_proxy` ()
- static void `dispose_query_proxy` (`rm_query_proxy` &query)

### 8.55.1 Detailed Description

This class represents a singleton that allows to configure the reordering model and then issue a proxy object for performing the queries against it.

Definition at line 52 of file `rm_configurator.hpp`.

### 8.55.2 Member Function Documentation

#### 8.55.2.1 `static rm_query_proxy& uva::smt::bpbd::server::rm::rm_configurator::allocate_query_proxy ( ) [inline], [static]`

Allows to return an instance of the query proxy, is to be returned by calling the dispose method.

**Returns**

an instance of the query executor.

Definition at line 91 of file `rm_configurator.hpp`.

**8.55.2.2** `static void uva::smt::bpbd::server::rm::rm_configurator::connect ( const rm_parameters & params )`  
`[inline], [static]`

This method allows to connect to the reordering model. This method is to be called only once! The latter is not checked but is a must.

**Parameters**

|               |                                                                                                   |
|---------------|---------------------------------------------------------------------------------------------------|
| <i>params</i> | the reordering model parameters to be set, this class only stores the referent to the parameters. |
|---------------|---------------------------------------------------------------------------------------------------|

Definition at line 62 of file `rm_configurator.hpp`.

**8.55.2.3** `static void uva::smt::bpbd::server::rm::rm_configurator::disconnect ( )` `[inline], [static]`

Allows to disconnect from the reordering model.

Definition at line 76 of file `rm_configurator.hpp`.

**8.55.2.4** `static void uva::smt::bpbd::server::rm::rm_configurator::dispose_query_proxy ( rm_query_proxy & query )`  
`[inline], [static]`

Dispose the previously allocated query object

**Parameters**

|              |                      |
|--------------|----------------------|
| <i>query</i> | the query to dispose |
|--------------|----------------------|

Definition at line 102 of file `rm_configurator.hpp`.

The documentation for this class was generated from the following files:

- [inc/server/rm/rm\\_configurator.hpp](#)
- [src/server/rm/rm\\_configurator.cpp](#)

## 8.56 `uva::smt::bpbd::server::rm::models::rm_entry_temp< num_features >` Class Template Reference

```
#include <rm_entry.hpp>
```

**Public Member Functions**

- [rm\\_entry\\_temp](#) ()
- [~rm\\_entry\\_temp](#) ()
- const [prob\\_weight](#) \* [get\\_weights](#) () const
- template<bool is\_from>  
const [prob\\_weight](#) [get\\_weight](#) (const [reordering\\_orientation](#) orient) const
- [prob\\_weight](#) & [operator\[\]](#) (size\_t idx)
- void [set\\_entry\\_uid](#) (const [phrase\\_uid](#) &uid)
- bool [operator==](#) (const [phrase\\_uid](#) &uid) const
- bool [operator==](#) (const [rm\\_entry\\_temp](#) &other) const

## Static Public Attributes

- static constexpr uint8\_t [NUM\\_FEATURES](#) = num\_features

## Friends

- template<uint8\_t num\_weights>  
ostream & [operator<<](#) (ostream &stream, const [rm\\_entry\\_temp](#)< num\_weights > &entry)

### 8.56.1 Detailed Description

template<uint8\_t num\_features>class uva::smt::bpbd::server::rm::models::rm\_entry\_temp< num\_features >

This is the reordering entry class it stores the reordering penalties for one source to target phrase.

#### Parameters

|                     |                                     |
|---------------------|-------------------------------------|
| <i>num_features</i> | is the number of reordering weights |
|---------------------|-------------------------------------|

Definition at line 68 of file rm\_entry.hpp.

### 8.56.2 Constructor & Destructor Documentation

8.56.2.1 template<uint8\_t num\_features> uva::smt::bpbd::server::rm::models::rm\_entry\_temp< num\_features >::rm\_entry\_temp( ) [inline]

The basic constructor

Definition at line 76 of file rm\_entry.hpp.

8.56.2.2 template<uint8\_t num\_features> uva::smt::bpbd::server::rm::models::rm\_entry\_temp< num\_features >::~~rm\_entry\_temp( ) [inline]

The basic destructor

Definition at line 83 of file rm\_entry.hpp.

### 8.56.3 Member Function Documentation

8.56.3.1 template<uint8\_t num\_features> template<bool is\_from> const prob\_weight uva::smt::bpbd::server::rm::models::rm\_entry\_temp< num\_features >::get\_weight( const reordering\_orientation *orient* ) const [inline]

Allows to get the weight for the given distortion value

#### Parameters

|                |                                                                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>is_from</i> | the flag allowing to distinguish between the from and to case if true then we get the value from the from source phrase case if false then we get the value for the to source phrase case |
| <i>orient</i>  | the reordering orientation                                                                                                                                                                |

#### Returns

the weight for the given distortion value

Definition at line 103 of file rm\_entry.hpp.

8.56.3.2 `template<uint8_t num_features> const prob_weight* uva::smt::bpbd::server::rm::models::rm_entry_↵  
temp< num_features >::get_weights ( ) const [inline]`

Allows to get the entry weights array

Returns

the entry weights array

Definition at line 90 of file `rm_entry.hpp`.

8.56.3.3 `template<uint8_t num_features> bool uva::smt::bpbd::server::rm::models::rm_entry_temp<  
num_features >::operator== ( const phrase_uid & uid ) const [inline]`

The comparison operator, allows to compare entries

Parameters

|                   |                                                                              |
|-------------------|------------------------------------------------------------------------------|
| <i>phrase_uid</i> | the unique identifier of the source/target phrase pair entry to compare with |
|-------------------|------------------------------------------------------------------------------|

Returns

true if the provided uid is equal to the uid of this entry, otherwise false

Definition at line 161 of file `rm_entry.hpp`.

8.56.3.4 `template<uint8_t num_features> bool uva::smt::bpbd::server::rm::models::rm_entry_temp<  
num_features >::operator== ( const rm_entry_temp< num_features > & other ) const [inline]`

The comparison operator, allows to compare entries

Parameters

|              |                                 |
|--------------|---------------------------------|
| <i>other</i> | the other entry to compare with |
|--------------|---------------------------------|

Returns

true if the provided entry has the same uid as this one, otherwise false

Definition at line 170 of file `rm_entry.hpp`.

8.56.3.5 `template<uint8_t num_features> prob_weight& uva::smt::bpbd::server::rm::models::rm_entry_temp<  
num_features >::operator[] ( size_t idx ) [inline]`

This operator allows to work with the given reordering entry weights in an array fashion

Parameters

|            |                          |
|------------|--------------------------|
| <i>idx</i> | the index of the feature |
|------------|--------------------------|

Returns

the feature value

Definition at line 139 of file `rm_entry.hpp`.

8.56.3.6 `template<uint8_t num_features> void uva::smt::bpbd::server::rm::models::rm_entry_temp<  
num_features >::set_entry_uid ( const phrase_uid & uid ) [inline]`

Allows to set the unique source target entry identifier



## Parameters

|            |                                                  |
|------------|--------------------------------------------------|
| <i>uid</i> | the unique identifier of the source/target entry |
|------------|--------------------------------------------------|

Definition at line 152 of file `rm_entry.hpp`.

## 8.56.4 Friends And Related Function Documentation

8.56.4.1 `template<uint8_t num_features> template<uint8_t num_weights> ostream& operator<< ( ostream & stream, const rm_entry_temp< num_weights > & entry ) [friend]`

This operator allows to stream the reordering entry to the output stream

## Parameters

|               |                                  |
|---------------|----------------------------------|
| <i>stream</i> | the stream to send the data into |
| <i>entry</i>  | the entry to stream              |

## Returns

the reference to the same stream is returned

Definition at line 198 of file `rm_entry.hpp`.

## 8.56.5 Member Data Documentation

8.56.5.1 `template<uint8_t num_features> constexpr uint8_t uva::smt::bpbdd::server::rm::models::rm_entry_temp< num_features >::NUM_FEATURES = num_features [static]`

Definition at line 71 of file `rm_entry.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/rm/models/rm_entry.hpp`

## 8.57 uva::smt::bpbdd::server::rm::rm\_parameters Struct Reference

```
#include <rm_parameters.hpp>
```

## Public Member Functions

- void `finalize` ()

## Public Attributes

- string `m_conn_string`
- size\_t `m_num_lambdas`
- float `m_lambdas` [NUM\_RM\_FEATURES]

## 8.57.1 Detailed Description

This structure stores the reordering model parameters

Definition at line 53 of file `rm_parameters.hpp`.

## 8.57.2 Member Function Documentation

### 8.57.2.1 void uva::smt::bpbdd::server::rm::rm\_parameters::finalize ( ) [inline]

Allows to verify the parameters to be correct.

Definition at line 66 of file rm\_parameters.hpp.

## 8.57.3 Member Data Documentation

### 8.57.3.1 string uva::smt::bpbdd::server::rm::rm\_parameters::m\_conn\_string

Definition at line 55 of file rm\_parameters.hpp.

### 8.57.3.2 float uva::smt::bpbdd::server::rm::rm\_parameters::m\_lambdas[NUM\_RM\_FEATURES]

Definition at line 61 of file rm\_parameters.hpp.

### 8.57.3.3 size\_t uva::smt::bpbdd::server::rm::rm\_parameters::m\_num\_lambdas

Definition at line 58 of file rm\_parameters.hpp.

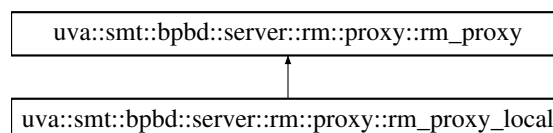
The documentation for this struct was generated from the following file:

- [inc/server/rm/rm\\_parameters.hpp](#)

## 8.58 uva::smt::bpbdd::server::rm::proxy::rm\_proxy Class Reference

```
#include <rm_proxy.hpp>
```

Inheritance diagram for uva::smt::bpbdd::server::rm::proxy::rm\_proxy:



## Public Member Functions

- virtual void [connect](#) (const [rm\\_parameters](#) &params)=0
- virtual void [disconnect](#) ()=0
- virtual [~rm\\_proxy](#) ()
- virtual [rm\\_query\\_proxy](#) & [allocate\\_query\\_proxy](#) ()=0
- virtual void [dispose\\_query\\_proxy](#) ([rm\\_query\\_proxy](#) &query)=0

### 8.58.1 Detailed Description

This is the reordering model proxy interface class it allows to interact with any sort of local and remote models in a uniform way.

Definition at line 42 of file rm\_proxy.hpp.

## 8.58.2 Constructor & Destructor Documentation

8.58.2.1 `virtual uva::smt::bpbd::server::rm::proxy::rm_proxy::~rm_proxy ( ) [inline], [virtual]`

The basic virtual destructor

Definition at line 59 of file `rm_proxy.hpp`.

## 8.58.3 Member Function Documentation

8.58.3.1 `virtual rm_query_proxy& uva::smt::bpbd::server::rm::proxy::rm_proxy::allocate_query_proxy ( ) [pure virtual]`

This method allows to get a query executor for the given trie

Returns

the trie query proxy object

Implemented in [uva::smt::bpbd::server::rm::proxy::rm\\_proxy\\_local](#).

8.58.3.2 `virtual void uva::smt::bpbd::server::rm::proxy::rm_proxy::connect ( const rm_parameters & params ) [pure virtual]`

Allows to connect to the model object based on the given parameters

Parameters

|               |                      |
|---------------|----------------------|
| <i>params</i> | the model parameters |
|---------------|----------------------|

Implemented in [uva::smt::bpbd::server::rm::proxy::rm\\_proxy\\_local](#).

8.58.3.3 `virtual void uva::smt::bpbd::server::rm::proxy::rm_proxy::disconnect ( ) [pure virtual]`

Allows to disconnect from the trie

Implemented in [uva::smt::bpbd::server::rm::proxy::rm\\_proxy\\_local](#).

8.58.3.4 `virtual void uva::smt::bpbd::server::rm::proxy::rm_proxy::dispose_query_proxy ( rm_query_proxy & query ) [pure virtual]`

Dispose the previously allocated query object

Parameters

|              |                      |
|--------------|----------------------|
| <i>query</i> | the query to dispose |
|--------------|----------------------|

Implemented in [uva::smt::bpbd::server::rm::proxy::rm\\_proxy\\_local](#).

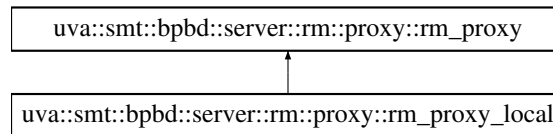
The documentation for this class was generated from the following file:

- [inc/server/rm/proxy/rm\\_proxy.hpp](#)

## 8.59 uva::smt::bpbd::server::rm::proxy::rm\_proxy\_local Class Reference

```
#include <rm_proxy_local.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::rm::proxy::rm_proxy_local`:



## Public Member Functions

- [rm\\_proxy\\_local](#) ()
- virtual [~rm\\_proxy\\_local](#) ()
- virtual void [connect](#) (const [rm\\_parameters](#) &params)
- virtual void [disconnect](#) ()
- virtual [rm\\_query\\_proxy](#) & [allocate\\_query\\_proxy](#) ()
- virtual void [dispose\\_query\\_proxy](#) ([rm\\_query\\_proxy](#) &query)

## Protected Member Functions

- template<typename [rm\\_builder\\_type](#) , typename [file\\_reader\\_type](#) >  
void [load\\_model\\_data](#) (char const \*model\_name, const [rm\\_parameters](#) &params)

### 8.59.1 Detailed Description

This is the reordering model proxy interface class it allows to interact with any sort of local and remote models in a uniform way.

Definition at line 59 of file [rm\\_proxy\\_local.hpp](#).

### 8.59.2 Constructor & Destructor Documentation

#### 8.59.2.1 [uva::smt::bpbdd::server::rm::proxy::rm\\_proxy\\_local::rm\\_proxy\\_local](#) ( ) [inline]

The basic proxy constructor, currently does nothing except for default initialization

Definition at line 65 of file [rm\\_proxy\\_local.hpp](#).

#### 8.59.2.2 virtual [uva::smt::bpbdd::server::rm::proxy::rm\\_proxy\\_local::~~rm\\_proxy\\_local](#) ( ) [inline], [virtual]

The basic destructor

Definition at line 71 of file [rm\\_proxy\\_local.hpp](#).

### 8.59.3 Member Function Documentation

#### 8.59.3.1 virtual [rm\\_query\\_proxy](#)& [uva::smt::bpbdd::server::rm::proxy::rm\\_proxy\\_local::allocate\\_query\\_proxy](#) ( ) [inline], [virtual]

**Todo** {In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

See also

[rm\\_proxy](#)

Implements [uva::smt::bpbdd::server::rm::proxy::rm\\_proxy](#).

Definition at line 101 of file [rm\\_proxy\\_local.hpp](#).

8.59.3.2 `virtual void uva::smt::bpbd::server::rm::proxy::rm_proxy_local::connect ( const rm_parameters & params )`  
`[inline], [virtual]`

See also

[rm\\_proxy](#)

Implements [uva::smt::bpbd::server::rm::proxy::rm\\_proxy](#).

Definition at line 79 of file `rm_proxy_local.hpp`.

8.59.3.3 `virtual void uva::smt::bpbd::server::rm::proxy::rm_proxy_local::disconnect ( )` `[inline], [virtual]`

See also

[rm\\_proxy](#)

Implements [uva::smt::bpbd::server::rm::proxy::rm\\_proxy](#).

Definition at line 92 of file `rm_proxy_local.hpp`.

8.59.3.4 `virtual void uva::smt::bpbd::server::rm::proxy::rm_proxy_local::dispose_query_proxy ( rm_query_proxy & query )`  
`[inline], [virtual]`

Dispose the previously allocated query object

**Todo** {In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead}

Parameters

|              |                      |
|--------------|----------------------|
| <i>query</i> | the query to dispose |
|--------------|----------------------|

Implements [uva::smt::bpbd::server::rm::proxy::rm\\_proxy](#).

Definition at line 111 of file `rm_proxy_local.hpp`.

8.59.3.5 `template<typename rm_builder_type , typename file_reader_type > void uva::smt::bpbd::server::rm::proxy::rm_proxy_local::load_model_data ( char const * model_name, const rm_parameters & params )` `[inline], [protected]`

Allows to load the model into the instance of the selected container class

**Todo** Add the possibility to choose between the file readers from the command line!

Parameters

|            |                                                            |
|------------|------------------------------------------------------------|
| <i>the</i> | name of the model being loaded params the model parameters |
|------------|------------------------------------------------------------|

Definition at line 124 of file `rm_proxy_local.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/rm/proxy/rm_proxy_local.hpp`

## 8.60 uva::smt::bpbd::server::rm::models::rm\_query< model\_type > Class Template Reference

```
#include <rm_query.hpp>
```

## Public Types

- typedef unordered\_map< phrase\_uid, const rm\_entry \* > query\_map

## Public Member Functions

- rm\_query (const model\_type &model)
- virtual void execute (const vector< phrase\_uid > &st\_ids)
- ~rm\_query ()
- virtual const rm\_entry & get\_reordering (const phrase\_uid uid) const

### 8.60.1 Detailed Description

template<typename model\_type>class uva::smt::bpbd::server::rm::models::rm\_query< model\_type >

This class represents a query for the reordering model

Definition at line 54 of file rm\_query.hpp.

### 8.60.2 Member Typedef Documentation

8.60.2.1 template<typename model\_type> typedef unordered\_map<phrase\_uid, const rm\_entry \*> uva::smt::bpbd::server::rm::models::rm\_query< model\_type >::query\_map

Definition at line 59 of file rm\_query.hpp.

### 8.60.3 Constructor & Destructor Documentation

8.60.3.1 template<typename model\_type> uva::smt::bpbd::server::rm::models::rm\_query< model\_type >::rm\_query ( const model\_type & model ) [inline]

The basic constructor

Definition at line 64 of file rm\_query.hpp.

8.60.3.2 template<typename model\_type> uva::smt::bpbd::server::rm::models::rm\_query< model\_type >::~~rm\_query ( ) [inline]

The basic destructor

Definition at line 93 of file rm\_query.hpp.

### 8.60.4 Member Function Documentation

8.60.4.1 template<typename model\_type> virtual void uva::smt::bpbd::server::rm::models::rm\_query< model\_type >::execute ( const vector< phrase\_uid > & st\_ids ) [inline],[virtual]

Allows to execute the query, for the given source/target phrase ids

Parameters

---

|               |                                                                                     |
|---------------|-------------------------------------------------------------------------------------|
| <i>st_ids</i> | is the list of the source/target phrase ids for which the reordering data is needed |
|---------------|-------------------------------------------------------------------------------------|

Definition at line 72 of file rm\_query.hpp.

```
8.60.4.2 template<typename model_type> virtual const rm_entry& uva::smt::bpbd::server::rm::models←
::rm_query< model_type >::get_reordering (const phrase_uid uid) const [inline],
[virtual]
```

Allows to get the source/target reordering data from the reordering model

Parameters

|            |                              |
|------------|------------------------------|
| <i>uid</i> | the source/target phrase uid |
|------------|------------------------------|

Returns

the reference to the source entry, might be the one of UNK if the reordering was not found.

Definition at line 103 of file rm\_query.hpp.

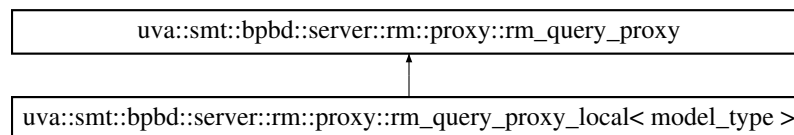
The documentation for this class was generated from the following file:

- inc/server/rm/models/rm\_query.hpp

## 8.61 uva::smt::bpbd::server::rm::proxy::rm\_query\_proxy Class Reference

```
#include <rm_query_proxy.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::rm::proxy::rm\_query\_proxy:



### Public Member Functions

- virtual void [execute](#) (const vector< [phrase\\_uid](#) > &st\_ids)=0
- virtual const [rm\\_entry](#) & [get\\_begin\\_tag\\_reordering](#) () const =0
- virtual const [rm\\_entry](#) & [get\\_end\\_tag\\_reordering](#) () const =0
- virtual const [rm\\_entry](#) & [get\\_reordering](#) (const [phrase\\_uid](#) uid) const =0
- virtual [~rm\\_query\\_proxy](#) ()

### 8.61.1 Detailed Description

This class represents a reordering query proxy interface class. It allows to interact with reordering model queries in a uniform way.

Definition at line 52 of file rm\_query\_proxy.hpp.

### 8.61.2 Constructor & Destructor Documentation

8.61.2.1 `virtual uva::smt::bpbd::server::rm::proxy::rm_query_proxy::~~rm_query_proxy ( ) [inline],[virtual]`

The basic virtual destructor

Definition at line 85 of file `rm_query_proxy.hpp`.

### 8.61.3 Member Function Documentation

8.61.3.1 `virtual void uva::smt::bpbd::server::rm::proxy::rm_query_proxy::execute ( const vector< phrase_uid > & st_ids ) [pure virtual]`

Allows to execute the query, for the given source/target phrase ids

Parameters

|                     |                                                                                     |
|---------------------|-------------------------------------------------------------------------------------|
| <code>st_ids</code> | is the list of the source/target phrase ids for which the reordering data is needed |
|---------------------|-------------------------------------------------------------------------------------|

Implemented in [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy\\_local< model\\_type >](#).

8.61.3.2 `virtual const rm_entry& uva::smt::bpbd::server::rm::proxy::rm_query_proxy::get_begin_tag_reordering ( ) const [pure virtual]`

Allows to retrieve the begin tag reordering entry from the reordering model

Returns

the start tag reordering entry

Implemented in [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy\\_local< model\\_type >](#).

8.61.3.3 `virtual const rm_entry& uva::smt::bpbd::server::rm::proxy::rm_query_proxy::get_end_tag_reordering ( ) const [pure virtual]`

Allows to retrieve the end tag reordering entry from the reordering model

Returns

the start tag reordering entry

Implemented in [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy\\_local< model\\_type >](#).

8.61.3.4 `virtual const rm_entry& uva::smt::bpbd::server::rm::proxy::rm_query_proxy::get_reordering ( const phrase_uid uid ) const [pure virtual]`

Allows to get the source/target reordering data from the reordering model

Parameters

|                  |                              |
|------------------|------------------------------|
| <code>uid</code> | the source/target phrase uid |
|------------------|------------------------------|

Returns

the reference to the source entry, might be the one of UNK if the reordering was not found.

Implemented in [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy\\_local< model\\_type >](#).

The documentation for this class was generated from the following file:

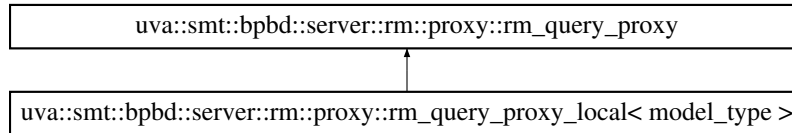
- [inc/server/rm/proxy/rm\\_query\\_proxy.hpp](#)



## 8.62 uva::smt::bpbd::server::rm::proxy::rm\_query\_proxy\_local< model\_type > Class Template Reference

```
#include <rm_query_proxy_local.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::rm::proxy::rm\_query\_proxy\_local< model\_type >:



### Public Member Functions

- [rm\\_query\\_proxy\\_local](#) (const model\_type &model, const [rm\\_entry](#) &begin\_tag\_entry, const [rm\\_entry](#) &end\_tag\_entry)
- virtual const [rm\\_entry](#) & [get\\_begin\\_tag\\_reordering](#) () const
- virtual const [rm\\_entry](#) & [get\\_end\\_tag\\_reordering](#) () const
- virtual const [rm\\_entry](#) & [get\\_reordering](#) (const [phrase\\_uid](#) uid) const
- virtual void [execute](#) (const vector< [phrase\\_uid](#) > &st\_ids)
- virtual [~rm\\_query\\_proxy\\_local](#) ()

### 8.62.1 Detailed Description

```
template<typename model_type>class uva::smt::bpbd::server::rm::proxy::rm_query_proxy_local< model_type >
```

This is a local implementation of the reordering model query This implementation works with the local reordering model

Definition at line 48 of file [rm\\_query\\_proxy\\_local.hpp](#).

### 8.62.2 Constructor & Destructor Documentation

8.62.2.1 `template<typename model_type> uva::smt::bpbd::server::rm::proxy::rm_query_proxy_local< model_type >::rm_query_proxy_local ( const model_type & model, const rm_entry & begin_tag_entry, const rm_entry & end_tag_entry ) [inline]`

The basic constructor that accepts the reordering model reference to query to

Parameters

|                        |                                           |
|------------------------|-------------------------------------------|
| <i>model</i>           | the reordering model to query             |
| <i>begin_tag_entry</i> | the reference to the begin tag reordering |
| <i>end_tag_entry</i>   | the reference to the end tag reordering   |

Definition at line 57 of file [rm\\_query\\_proxy\\_local.hpp](#).

8.62.2.2 `template<typename model_type> virtual uva::smt::bpbd::server::rm::proxy::rm_query_proxy_local< model_type >::~~rm_query_proxy_local ( ) [inline],[virtual]`

See also

[rm\\_query\\_proxy](#)

Definition at line 97 of file [rm\\_query\\_proxy\\_local.hpp](#).

### 8.62.3 Member Function Documentation

8.62.3.1 `template<typename model_type> virtual void uva::smt::bpbd::server::rm::proxy::rm_query↵  
_proxy_local< model_type >::execute ( const vector< phrase_uid > & st_ids ) [inline],  
[virtual]`

See also

[rm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy](#).

Definition at line 90 of file `rm_query_proxy_local.hpp`.

8.62.3.2 `template<typename model_type> virtual const rm_entry& uva::smt::bpbd::server::rm::proxy↵  
::rm_query_proxy_local< model_type >::get_begin_tag_reordering ( ) const [inline],  
[virtual]`

Allows to retrieve the begin tag reordering entry from the reordering model

Returns

the start tag reordering entry

Implements [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy](#).

Definition at line 66 of file `rm_query_proxy_local.hpp`.

8.62.3.3 `template<typename model_type> virtual const rm_entry& uva::smt::bpbd::server::rm::proxy↵  
::rm_query_proxy_local< model_type >::get_end_tag_reordering ( ) const [inline],  
[virtual]`

Allows to retrieve the end tag reordering entry from the reordering model

Returns

the start tag reordering entry

Implements [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy](#).

Definition at line 75 of file `rm_query_proxy_local.hpp`.

8.62.3.4 `template<typename model_type> virtual const rm_entry& uva::smt::bpbd::server::rm::proxy::rm_↵  
query_proxy_local< model_type >::get_reordering ( const phrase_uid uid ) const [inline],  
[virtual]`

See also

[rm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy](#).

Definition at line 83 of file `rm_query_proxy_local.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/rm/proxy/rm_query_proxy_local.hpp`

## 8.63 uva::smt::bpbd::server::lm::\_\_H2DMapTrie::S\_M\_GramData< TPayloadType > Struct Template Reference

```
#include <h2d_map_trie.hpp>
```

### Public Types

- typedef uint64\_t [TM\\_Gram\\_Id](#)
- typedef [S\\_M\\_GramData](#)< TPayloadType > [SELF](#)

### Public Member Functions

- [S\\_M\\_GramData](#) ()
- [~S\\_M\\_GramData](#) ()
- bool [operator==](#) (const [TM\\_Gram\\_Id](#) &id) const

### Public Attributes

- [TM\\_Gram\\_Id](#) [m\\_id](#)
- TPayloadType [m\\_payload](#)

#### 8.63.1 Detailed Description

```
template<typename TPayloadType>struct uva::smt::bpbd::server::lm::__H2DMapTrie::S_M_GramData< TPayloadType >
```

This template structure is used for storing trie hash map elements Each element contains and id of the m-gram and its payload - the probability/back-off data, the latter is the template parameter

#### Parameters

|                |                                                                             |
|----------------|-----------------------------------------------------------------------------|
| <i>id</i>      | stores the M-gram id                                                        |
| <i>payload</i> | stores the payload which is either probability or probability with back-off |

Definition at line 71 of file `h2d_map_trie.hpp`.

#### 8.63.2 Member Typedef Documentation

8.63.2.1 `template<typename TPayloadType > typedef S_M_GramData<TPayloadType>  
uva::smt::bpbd::server::lm::__H2DMapTrie::S_M_GramData< TPayloadType >::SELF`

Definition at line 75 of file `h2d_map_trie.hpp`.

8.63.2.2 `template<typename TPayloadType > typedef uint64_t uva::smt::bpbd::server::lm::__H2DMapTrie::S_M_↔  
GramData< TPayloadType >::TM_Gram_Id`

Definition at line 73 of file `h2d_map_trie.hpp`.

#### 8.63.3 Constructor & Destructor Documentation

8.63.3.1 `template<typename TPayloadType > uva::smt::bpbd::server::lm::__H2DMapTrie::S_M_GramData<  
TPayloadType >::S_M_GramData ( ) [inline]`

The basic constructor

Definition at line 86 of file h2d\_map\_trie.hpp.

8.63.3.2 `template<typename TPayloadType > uva::smt::bpbd::server::lm::__H2DMapTrie::S_M_GramData< TPayloadType >::~~S_M_GramData ( ) [inline]`

The basic destructor

Definition at line 92 of file h2d\_map\_trie.hpp.

## 8.63.4 Member Function Documentation

8.63.4.1 `template<typename TPayloadType > bool uva::smt::bpbd::server::lm::__H2DMapTrie::S_M_GramData< TPayloadType >::operator==( const TM_Gram_Id & id ) const [inline]`

The comparison operator, allows to compare two m-gram ids

Parameters

|           |                               |
|-----------|-------------------------------|
| <i>id</i> | the m-gram id to compare with |
|-----------|-------------------------------|

Returns

true if the ids are equal, otherwise false

Definition at line 101 of file h2d\_map\_trie.hpp.

## 8.63.5 Member Data Documentation

8.63.5.1 `template<typename TPayloadType > TM_Gram_Id uva::smt::bpbd::server::lm::__H2DMapTrie::S_M_GramData< TPayloadType >::m_id`

Definition at line 78 of file h2d\_map\_trie.hpp.

8.63.5.2 `template<typename TPayloadType > TPayloadType uva::smt::bpbd::server::lm::__H2DMapTrie::S_M_GramData< TPayloadType >::m_payload`

Definition at line 81 of file h2d\_map\_trie.hpp.

The documentation for this struct was generated from the following file:

- [inc/server/lm/models/h2d\\_map\\_trie.hpp](#)

## 8.64 `uva::smt::bpbd::server::lm::__W2CArrayTrie::S_M_GramData< PAYLOAD_TYPE >` Struct Template Reference

```
#include <w2c_array_trie.hpp>
```

### Public Attributes

- [TShortId id](#)
- [PAYLOAD\\_TYPE payload](#)

## Static Public Attributes

- static const `mem_increase_strategy m_mem_strat`

### 8.64.1 Detailed Description

```
template<typename PAYLOAD_TYPE>struct uva::smt::bpbd::server::lm::__W2CArraryTrie::S_M_GramData< PAYLOAD_TYP↵
E >
```

This template structure is used for storing trie element data Each element contains a context id of the m-gram and its payload - the probability/back-off data, the latter is the template parameter

Definition at line 64 of file `w2c_array_trie.hpp`.

### 8.64.2 Member Data Documentation

8.64.2.1 `template<typename PAYLOAD_TYPE > TShortId uva::smt::bpbd::server::lm::__W2CArraryTrie::S_M_↵`  
`GramData< PAYLOAD_TYPE >::id`

Definition at line 65 of file `w2c_array_trie.hpp`.

8.64.2.2 `template<typename PAYLOAD_TYPE > const mem_increase_strategy uva::smt::bpbd↵`  
`::server::lm::__W2CArraryTrie::S_M_GramData< PAYLOAD_TYPE >::m_mem_strat`  
`[static]`

#### Initial value:

```
=
 get_mem_incr_strat(__W2CArraryTrie::MEM_INC_TYPE,
 __W2CArraryTrie::MIN_MEM_INC_NUM, __W2CArraryTrie::MEM_INC_FACTOR)
```

Definition at line 69 of file `w2c_array_trie.hpp`.

8.64.2.3 `template<typename PAYLOAD_TYPE > PAYLOAD_TYPE uva::smt::bpbd::server::lm::__W2CArraryTrie::S↵`  
`_M_GramData< PAYLOAD_TYPE >::payload`

Definition at line 66 of file `w2c_array_trie.hpp`.

The documentation for this struct was generated from the following file:

- `inc/server/lm/models/w2c_array_trie.hpp`

## 8.65 `uva::smt::bpbd::server::lm::__G2DMapTrie::S_M_GramData< TPayloadType, T↵` `WordIdType > Struct Template Reference`

```
#include <g2d_map_trie.hpp>
```

## Public Types

- typedef `Byte_M_Gram_Id< TWordIdType > TM_Gram_Id`
- typedef `S_M_GramData< TPayloadType, TWordIdType > SELF`

## Public Member Functions

- [S\\_M\\_GramData](#) ()
- [~S\\_M\\_GramData](#) ()
- `bool operator== (const T\_Gram\_Id\_Key &key) const`

## Public Attributes

- [TM\\_Gram\\_Id\\_Value\\_Ptr](#) `m_id`
- `TPayloadType` [m\\_payload](#)

### 8.65.1 Detailed Description

```
template<typename TPayloadType, typename TWorldType>struct uva::smt::bpbd::server::lm::__G2DMapTrie::S_M_Gram↔
Data< TPayloadType, TWorldType >
```

This template structure is used for storing trie hash map elements Each element contains and id of the m-gram and its payload - the probability/back-off data, the latter is the template parameter

NOTE: In order to save space and increase the speed we could store key to be the hash value of the m-gram, but then we will get the h2dm trie.

#### Parameters

|                |                                                                             |
|----------------|-----------------------------------------------------------------------------|
| <i>id</i>      | stores the M-gram id                                                        |
| <i>payload</i> | stores the payload which is either probability or probability with back-off |

Definition at line 77 of file g2d\_map\_trie.hpp.

### 8.65.2 Member Typedef Documentation

8.65.2.1 `template<typename TPayloadType , typename TWorldType > typedef S_M_GramData<TPayloadType, TWorldType> uva::smt::bpbd::server::lm::__G2DMapTrie::S_M_GramData< TPayloadType, TWorldType >::SELF`

Definition at line 81 of file g2d\_map\_trie.hpp.

8.65.2.2 `template<typename TPayloadType , typename TWorldType > typedef Byte_M_Gram_Id<TWorldType> uva::smt::bpbd::server::lm::__G2DMapTrie::S_M_GramData< TPayloadType, TWorldType >::TM_Gram_Id`

Definition at line 79 of file g2d\_map\_trie.hpp.

### 8.65.3 Constructor & Destructor Documentation

8.65.3.1 `template<typename TPayloadType , typename TWorldType > uva::smt::bpbd::server::lm↔  
::__G2DMapTrie::S_M_GramData< TPayloadType, TWorldType >::S_M_GramData ( )  
[inline]`

The basic constructor

Definition at line 91 of file g2d\_map\_trie.hpp.

```
8.65.3.2 template<typename TPayloadType , typename TWorldIdType > uva::smt::bpbd::server::lm::__G2DMapTrie::S_M_GramData< TPayloadType, TWorldIdType >::~~S_M_GramData ()
[inline]
```

The basic destructor

Definition at line 97 of file g2d\_map\_trie.hpp.

## 8.65.4 Member Function Documentation

```
8.65.4.1 template<typename TPayloadType , typename TWorldIdType > bool uva::smt::bpbd::server::lm::__G2DMapTrie::S_M_GramData< TPayloadType, TWorldIdType >::operator== (const T_Gram_Id_Key & key) const
[inline]
```

The comparison operator, allows to compare two m-gram ids

Parameters

|           |                               |
|-----------|-------------------------------|
| <i>id</i> | the m-gram id to compare with |
|-----------|-------------------------------|

Returns

true if the ids are equal, otherwise false

Definition at line 108 of file g2d\_map\_trie.hpp.

## 8.65.5 Member Data Documentation

```
8.65.5.1 template<typename TPayloadType , typename TWorldIdType > TM_Gram_Id_Value_Ptr
uva::smt::bpbd::server::lm::__G2DMapTrie::S_M_GramData< TPayloadType, TWorldIdType >::m_id
```

Definition at line 84 of file g2d\_map\_trie.hpp.

```
8.65.5.2 template<typename TPayloadType , typename TWorldIdType > TPayloadType uva::smt::bpbd::server::lm::__G2DMapTrie::S_M_GramData< TPayloadType, TWorldIdType >::m_payload
```

Definition at line 86 of file g2d\_map\_trie.hpp.

The documentation for this struct was generated from the following file:

- [inc/server/lm/models/g2d\\_map\\_trie.hpp](#)

## 8.66 uva::smt::bpbd::server::decoder::sentence::sentence\_decoder Class Reference

```
#include <sentence_decoder.hpp>
```

### Public Member Functions

- [sentence\\_decoder](#) (const [de\\_parameters](#) &params, [acr\\_bool\\_flag](#) is\_stop, const string &source\_sent, string &target\_sent)
- [~sentence\\_decoder](#) ()
- void [translate](#) ()

## Protected Member Functions

- [prob\\_weight](#) & [initialize\\_future\\_costs](#) (const size\_t &start\_idx, const size\_t &end\_idx)
- void [compute\\_futue\\_costs](#) ()
- void [query\\_translation\\_model](#) ()
- void [query\\_reordering\\_model](#) ()
- void [perform\\_translation](#) ()

## Static Protected Member Functions

- static size\_t [count\\_words](#) (const string &sentence)

### 8.66.1 Detailed Description

This class represents a sentence translator utility. It receives a sentence to translate. Performs tokenization, lower-casing, splitting it into sub-phrases, performs decoding provides recombinates the result into the target sentence.

Definition at line 74 of file `sentence_decoder.hpp`.

### 8.66.2 Constructor & Destructor Documentation

**8.66.2.1** `uva::smt::bpbd::server::decoder::sentence::sentence_decoder ( const de_parameters & params, acr_bool_flag is_stop, const string & source_sent, string & target_sent ) [inline]`

The basic constructor

Parameters

|                    |                                                                                                                                 |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <i>params</i>      | the reference to the decoder parameters                                                                                         |
| <i>is_stop</i>     | the flag that will be set to true in case one needs to abort the translation process.                                           |
| <i>source_sent</i> | [in] the source language sentence to translate the source sentence is expected to be tokenized, reduced, and in the lower case. |
| <i>target_sent</i> | [out] the resulting target language sentence                                                                                    |

Definition at line 87 of file `sentence_decoder.hpp`.

**8.66.2.2** `uva::smt::bpbd::server::decoder::sentence::sentence_decoder::~~sentence_decoder ( ) [inline]`

The basic destructor

Definition at line 104 of file `sentence_decoder.hpp`.

### 8.66.3 Member Function Documentation

**8.66.3.1** `void uva::smt::bpbd::server::decoder::sentence::sentence_decoder::compute_futue_costs ( ) [inline], [protected]`

Allows to compute the future costs for the sentence.

Definition at line 192 of file `sentence_decoder.hpp`.

**8.66.3.2** `static size_t uva::smt::bpbd::server::decoder::sentence::sentence_decoder::count_words ( const string & sentence ) [inline], [static], [protected]`

Allows to count the number of tokens/words in the given sentence



## Parameters

|                 |                                    |
|-----------------|------------------------------------|
| <i>sentence</i> | the sentence to count the words in |
|-----------------|------------------------------------|

## Returns

the number of words

Definition at line 250 of file sentence\_decoder.hpp.

**8.66.3.3** `prob_weight& uva::smt::bpbd::server::decoder::sentence::sentence_decoder::initialize_future_costs ( const size_t & start_idx, const size_t & end_idx ) [inline], [protected]`

Dynamically initialize the future costs based on the estimates from the TM and LM models.

Definition at line 146 of file sentence\_decoder.hpp.

**8.66.3.4** `void uva::smt::bpbd::server::decoder::sentence::sentence_decoder::perform_translation ( ) [inline], [protected]`

Performs the sentence translation

Definition at line 378 of file sentence\_decoder.hpp.

**8.66.3.5** `void uva::smt::bpbd::server::decoder::sentence::sentence_decoder::query_reordering_model ( ) [inline], [protected]`

Allows to query the reordering model based on the set sentence phrases

Definition at line 360 of file sentence\_decoder.hpp.

**8.66.3.6** `void uva::smt::bpbd::server::decoder::sentence::sentence_decoder::query_translation_model ( ) [inline], [protected]`

Allows to set the source sentence, this includes preparing things for decoding

Definition at line 270 of file sentence\_decoder.hpp.

**8.66.3.7** `void uva::smt::bpbd::server::decoder::sentence::sentence_decoder::translate ( ) [inline]`

This is the main method needed to be called for translating a sentence.

Definition at line 114 of file sentence\_decoder.hpp.

The documentation for this class was generated from the following file:

- inc/server/decoder/sentence/[sentence\\_decoder.hpp](#)

## 8.67 uva::smt::bpbd::server::server\_parameters Struct Reference

```
#include <server_parameters.hpp>
```

### Public Member Functions

- void [verify](#) ()

## Public Attributes

- string [m\\_source\\_lang](#)
- string [m\\_target\\_lang](#)
- uint16\_t [m\\_server\\_port](#)
- size\_t [m\\_num\\_threads](#)
- [tm\\_parameters](#) [m\\_tm\\_params](#)
- [rm\\_parameters](#) [m\\_rm\\_params](#)
- [lm\\_parameters](#) [m\\_lm\\_params](#)
- [de\\_parameters](#) [m\\_de\\_params](#)

### 8.67.1 Detailed Description

This structure stores the translation server parameters

Definition at line 58 of file `server_parameters.hpp`.

### 8.67.2 Member Function Documentation

8.67.2.1 `void uva::smt::bpbd::server::server_parameters::verify ( ) [inline]`

Allows to verify the parameters to be correct.

Definition at line 85 of file `server_parameters.hpp`.

### 8.67.3 Member Data Documentation

8.67.3.1 `de_parameters uva::smt::bpbd::server::server_parameters::m_de_params`

Definition at line 80 of file `server_parameters.hpp`.

8.67.3.2 `lm_parameters uva::smt::bpbd::server::server_parameters::m_lm_params`

Definition at line 77 of file `server_parameters.hpp`.

8.67.3.3 `size_t uva::smt::bpbd::server::server_parameters::m_num_threads`

Definition at line 68 of file `server_parameters.hpp`.

8.67.3.4 `rm_parameters uva::smt::bpbd::server::server_parameters::m_rm_params`

Definition at line 74 of file `server_parameters.hpp`.

8.67.3.5 `uint16_t uva::smt::bpbd::server::server_parameters::m_server_port`

Definition at line 65 of file `server_parameters.hpp`.

8.67.3.6 `string uva::smt::bpbd::server::server_parameters::m_source_lang`

Definition at line 60 of file `server_parameters.hpp`.

## 8.67.3.7 string uva::smt::bpbd::server::server\_parameters::m\_target\_lang

Definition at line 62 of file server\_parameters.hpp.

## 8.67.3.8 tm\_parameters uva::smt::bpbd::server::server\_parameters::m\_tm\_params

Definition at line 71 of file server\_parameters.hpp.

The documentation for this struct was generated from the following file:

- inc/server/[server\\_parameters.hpp](#)

## 8.68 uva::smt::bpbd::server::decoder::stack::stack\_data Struct Reference

```
#include <stack_data.hpp>
```

## Public Member Functions

- [stack\\_data](#) (const [de\\_parameters](#) &params, [acr\\_bool\\_flag](#) is\_stop, const string &source\_sent, const [sentence\\_data\\_map](#) &sent\_data, const [rm\\_query\\_proxy](#) &rm\_query, [lm\\_fast\\_query\\_proxy](#) &lm\_query, const [add\\_new\\_state\\_function](#) &add\_state)

## Public Attributes

- const [de\\_parameters](#) & m\_params
- [acr\\_bool\\_flag](#) m\_is\_stop
- const string & m\_source\_sent
- const [sentence\\_data\\_map](#) & m\_sent\_data
- const [rm\\_query\\_proxy](#) & m\_rm\_query
- [lm\\_fast\\_query\\_proxy](#) & m\_lm\_query
- const [add\\_new\\_state\\_function](#) m\_add\_state

## 8.68.1 Detailed Description

This structure stores the shared stack-state data. This data is valid within one sentence translation and is needed by multiple states and etc

Definition at line 54 of file stack\_data.hpp.

## 8.68.2 Constructor &amp; Destructor Documentation

8.68.2.1 uva::smt::bpbd::server::decoder::stack::stack\_data::stack\_data ( const [de\\_parameters](#) & params, [acr\\_bool\\_flag](#) is\_stop, const string & source\_sent, const [sentence\\_data\\_map](#) & sent\_data, const [rm\\_query\\_proxy](#) & rm\_query, [lm\\_fast\\_query\\_proxy](#) & lm\_query, const [add\\_new\\_state\\_function](#) & add\_state ) [inline]

The basic constructor to initialize the stored references

Parameters

---

|                    |                                       |
|--------------------|---------------------------------------|
| <i>params</i>      | the decoder parameters                |
| <i>is_stop</i>     | the stopping flag                     |
| <i>source_sent</i> | the reference to the source sentence  |
| <i>sent_data</i>   | the sentence data                     |
| <i>rm_query</i>    | the reordering model query            |
| <i>lm_query</i>    | the language model query to be used   |
| <i>add_state</i>   | the function needed to add new states |

Definition at line 66 of file `stack_data.hpp`.

### 8.68.3 Member Data Documentation

8.68.3.1 `const add_new_state_function uva::smt::bpbd::server::decoder::stack::stack_data::m_add_state`

Definition at line 92 of file `stack_data.hpp`.

8.68.3.2 `acr_bool_flag uva::smt::bpbd::server::decoder::stack::stack_data::m_is_stop`

Definition at line 77 of file `stack_data.hpp`.

8.68.3.3 `lm_fast_query_proxy& uva::smt::bpbd::server::decoder::stack::stack_data::m_lm_query`

Definition at line 89 of file `stack_data.hpp`.

8.68.3.4 `const de_parameters& uva::smt::bpbd::server::decoder::stack::stack_data::m_params`

Definition at line 74 of file `stack_data.hpp`.

8.68.3.5 `const rm_query_proxy& uva::smt::bpbd::server::decoder::stack::stack_data::m_rm_query`

Definition at line 86 of file `stack_data.hpp`.

8.68.3.6 `const sentence_data_map& uva::smt::bpbd::server::decoder::stack::stack_data::m_sent_data`

Definition at line 83 of file `stack_data.hpp`.

8.68.3.7 `const string& uva::smt::bpbd::server::decoder::stack::stack_data::m_source_sent`

Definition at line 80 of file `stack_data.hpp`.

The documentation for this struct was generated from the following file:

- `inc/server/decoder/stack/stack\_data.hpp`

## 8.69 `uva::smt::bpbd::server::decoder::stack::stack_level` Class Reference

```
#include <stack_level.hpp>
```

## Public Member Functions

- [stack\\_level](#) (const [de\\_parameters](#) &params, [acr\\_bool\\_flag](#) is\_stop)
- [~stack\\_level](#) ()
- void [add\\_state](#) ([stack\\_state\\_ptr](#) new\_state)
- void [expand](#) ()
- void [get\\_best\\_trans](#) (string &target\_sent) const
- [size\\_t](#) [get\\_size](#) () const

## Protected Member Functions

- bool [find\\_recombine](#) ([stack\\_state\\_ptr](#) &curr\_state, [stack\\_state](#) &new\_state)
- void [add\\_last](#) ([stack\\_state\\_ptr](#) new\_state)
- void [add\\_before](#) ([stack\\_state\\_ptr](#) curr\_state, [stack\\_state\\_ptr](#) new\_state)
- void [remember\\_best\\_score](#) ()
- bool [is\\_space\\_left](#) () const
- void [prune\\_states](#) ()
- void [insert\\_as\\_first](#) ([stack\\_state\\_ptr](#) state)
- void [insert\\_as\\_last](#) ([stack\\_state\\_ptr](#) state)
- void [insert\\_between](#) ([stack\\_state\\_ptr](#) prev, [stack\\_state\\_ptr](#) next, [stack\\_state\\_ptr](#) state)
- void [insert\\_before](#) ([stack\\_state\\_ptr](#) curr\_state, [stack\\_state\\_ptr](#) new\_state)
- void [remove\\_from\\_level](#) ([stack\\_state\\_ptr](#) state)

### 8.69.1 Detailed Description

Represents the multi-stack level

Definition at line 45 of file [stack\\_level.hpp](#).

### 8.69.2 Constructor & Destructor Documentation

**8.69.2.1** `uva::smt::bpbd::server::decoder::stack::stack_level::stack_level ( const de\_parameters & params, acr\_bool\_flag is_stop ) [inline]`

The basic constructor

Parameters

|                |                                                    |
|----------------|----------------------------------------------------|
| <i>params</i>  | the decoder parameters, stores the reference to it |
| <i>is_stop</i> | the stop flag                                      |

Definition at line 53 of file [stack\\_level.hpp](#).

**8.69.2.2** `uva::smt::bpbd::server::decoder::stack::stack_level::~~stack_level ( ) [inline]`

The basic destructor, this implementation is iterative.

Definition at line 62 of file [stack\\_level.hpp](#).

### 8.69.3 Member Function Documentation

**8.69.3.1** `void uva::smt::bpbd::server::decoder::stack::stack_level::add_before ( stack\_state\_ptr curr_state, stack\_state\_ptr new_state ) [inline], [protected]`

Allows to add a new state to the level before some existing state. The new state is to have a bigger weight that the provided current state and is to be non equal (recombinable) to any other state before. This method makes sure that

any state after the new one will be checked for a possible recombination to the new one, if yes the recombination will be done. Pruning is performed unconditionally. We know that the state satisfies the total weight threshold.

## Parameters

|                   |                                                                            |
|-------------------|----------------------------------------------------------------------------|
| <i>curr_state</i> | the pointer to the state, not NULL, we need to add the new state prior to. |
| <i>new_state</i>  | the pointer to the new state, not NULL                                     |

Definition at line 252 of file stack\_level.hpp.

**8.69.3.2** `void uva::smt::bpbd::server::decoder::stack::stack_level::add_last ( stack_state_ptr new_state ) [inline], [protected]`

Allows to add the new state as the last one to the level. This new state is to have the smallest weight that all the other states in the level and is not to be equal (recombinable) to any other state to the level. Note that we know that the new state cost is within the current threshold bound.

## Parameters

|                  |                                                                            |
|------------------|----------------------------------------------------------------------------|
| <i>new_state</i> | the new state to add as the last one, if satisfies the pruning thresholds. |
|------------------|----------------------------------------------------------------------------|

Definition at line 222 of file stack\_level.hpp.

**8.69.3.3** `void uva::smt::bpbd::server::decoder::stack::stack_level::add_state ( stack_state_ptr new_state ) [inline]`

Allows to add a new state into the level

## Parameters

|                  |                      |
|------------------|----------------------|
| <i>new_state</i> | the new state to add |
|------------------|----------------------|

Definition at line 82 of file stack\_level.hpp.

**8.69.3.4** `void uva::smt::bpbd::server::decoder::stack::stack_level::expand ( ) [inline]`

Allows to expand the stack elements, to do that this method just goes through all the stack elements one by one and expands them. We could have done this recursively but this way we avoid stack allocations so we might be just faster.

Definition at line 134 of file stack\_level.hpp.

**8.69.3.5** `bool uva::smt::bpbd::server::decoder::stack::stack_level::find_recombine ( stack_state_ptr & curr_state, stack_state & new_state ) [inline], [protected]`

This method allows to search for a position to insert the new state into. We known that the state satisfies the total weight threshold.

## Parameters

|                   |                                                 |
|-------------------|-------------------------------------------------|
| <i>curr_state</i> | [out]                                           |
| <i>new_state</i>  | [in] the new state to be inserted into the list |

## Returns

true if the new state was recombined into an existing one, otherwise false.

Definition at line 186 of file stack\_level.hpp.

**8.69.3.6** `void uva::smt::bpbd::server::decoder::stack::stack_level::get_best_trans ( string & target_sent ) const [inline]`

Allows to get the best translation target string for this stack. To do that, it takes the first element/state in the level's ordered by costs stack and asks it to unroll itself to give its translation.

## Parameters

|                    |                                             |
|--------------------|---------------------------------------------|
| <i>target_sent</i> | [out] the variable to store the translation |
|--------------------|---------------------------------------------|

Definition at line 158 of file stack\_level.hpp.

**8.69.3.7** `size_t uva::smt::bpbd::server::decoder::stack::stack_level::get_size ( ) const` `[inline]`

This method allows to retrieve the number of stack level elements

## Returns

the number of stack level elements.

Definition at line 173 of file stack\_level.hpp.

**8.69.3.8** `void uva::smt::bpbd::server::decoder::stack::stack_level::insert_as_first ( stack_state_ptr state )` `[inline]`,  
`[protected]`

Allows to insert the stack state as the first one in the level This method increments the level size counter. Updates the best score!

## Parameters

|              |                     |
|--------------|---------------------|
| <i>state</i> | the state to insert |
|--------------|---------------------|

Definition at line 359 of file stack\_level.hpp.

**8.69.3.9** `void uva::smt::bpbd::server::decoder::stack::stack_level::insert_as_last ( stack_state_ptr state )` `[inline]`,  
`[protected]`

Allows to insert the stack state as the last one in the level This method increments the level size counter. Updates the best score!

## Parameters

|              |                     |
|--------------|---------------------|
| <i>state</i> | the state to insert |
|--------------|---------------------|

Definition at line 394 of file stack\_level.hpp.

**8.69.3.10** `void uva::smt::bpbd::server::decoder::stack::stack_level::insert_before ( stack_state_ptr curr_state, stack_state_ptr new_state )` `[inline]`, `[protected]`

Allows to insert a new element before the given stack element in the level list This method increments the level size counter. Updates the best score!

## Parameters

|                   |                                                                  |
|-------------------|------------------------------------------------------------------|
| <i>curr_state</i> | the state before which the new state is to be inserted, not NULL |
| <i>new_state</i>  | the state to be inserted, NOT NULL                               |

Definition at line 460 of file stack\_level.hpp.

**8.69.3.11** `void uva::smt::bpbd::server::decoder::stack::stack_level::insert_between ( stack_state_ptr prev, stack_state_ptr next, stack_state_ptr state )` `[inline]`, `[protected]`

Allows to insert the stack state in between the given two elements Note that the next and previous states are to be different! This method increments the level size counter.



#### Parameters

|              |                                                   |
|--------------|---------------------------------------------------|
| <i>prev</i>  | the pointer reference to the prev state, NOT NULL |
| <i>next</i>  | the pointer reference to the next state, NOT NULL |
| <i>state</i> | the state to insert, NUL NULL                     |

Definition at line 428 of file `stack_level.hpp`.

8.69.3.12 `bool uva::smt::bpbd::server::decoder::stack::stack_level::is_space_left ( ) const` `[inline]`, `[protected]`

Allows to check if there is still space left for adding states into the level If there is no space left then we can still add states but we shall do histogram pruning afterwards in order to keep the stack size within the capacity limits.

#### Returns

true if there is empty space left for adding states

Definition at line 315 of file `stack_level.hpp`.

8.69.3.13 `void uva::smt::bpbd::server::decoder::stack::stack_level::prune_states ( )` `[inline]`, `[protected]`

This method makes sure there is not too many elements in the stack, the last ones are removed. This method decrements the level size counter.

Definition at line 326 of file `stack_level.hpp`.

8.69.3.14 `void uva::smt::bpbd::server::decoder::stack::stack_level::remember_best_score ( )` `[inline]`, `[protected]`

Allows to update the best score, or rather threshold for threshold pruning.

Definition at line 297 of file `stack_level.hpp`.

8.69.3.15 `void uva::smt::bpbd::server::decoder::stack::stack_level::remove_from_level ( stack_state_ptr state )` `[inline]`, `[protected]`

Allows to remove the given state from the level. The state is not destroyed, its memory is not deleted. This method decrements the level size counter. The given state must be within the level list of states!

#### Parameters

|              |                           |
|--------------|---------------------------|
| <i>state</i> | the state to be destroyed |
|--------------|---------------------------|

Definition at line 480 of file `stack_level.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/decoder/stack/stack_level.hpp`

8.70 `uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >` Class Template Reference

```
#include <stack_data.hpp>
```

## Public Types

- typedef [state\\_data\\_tmpl](#)< NUM\_WORDS\_PER\_SENTENCE, MAX\_HISTORY\_LENGTH, MAX\_M\_GRAM\_QUERY\_LENGTH > [state\\_data](#)

## Public Member Functions

- [stack\\_state\\_tmpl](#) (const [stack\\_data](#) &data)
- [stack\\_state\\_tmpl](#) ([stack\\_state\\_ptr](#) parent)
- [stack\\_state\\_tmpl](#) ([stack\\_state\\_ptr](#) parent, const int32\_t begin\_pos, const int32\_t end\_pos, const typename [state\\_data::covered\\_info](#) &covered, [tm\\_const\\_target\\_entry](#) \*target)
- [~stack\\_state\\_tmpl](#) ()
- uint32\_t [get\\_stack\\_level](#) () const
- void [expand](#) ()
- void [get\\_translation](#) (string &target\_sent) const
- bool [operator<](#) (const [stack\\_state](#) &other) const
- bool [operator==](#) (const [stack\\_state](#) &other) const
- bool [operator!=](#) (const [stack\\_state](#) &other) const
- bool [is\\_above\\_threshold](#) (const [prob\\_weight](#) &score\_bound) const
- void [recombine\\_from](#) ([stack\\_state\\_ptr](#) other\_state)

## Protected Member Functions

- void [cut\\_the\\_tail](#) ([stack\\_state\\_ptr](#) tail)
- void [count\\_and\\_prune](#) (size\_t state\_count, [stack\\_state\\_ptr](#) tail)
- void [merge\\_recomb\\_from](#) (const [stack\\_state\\_ptr](#) recomb\_from, const size\_t recomb\_from\_count)
- void [expand\\_length\\_if\\_not\\_covered](#) (int32\_t &curr\_pos, size\_t &num\_exp)
- void [expand\\_left](#) ()
- void [expand\\_right](#) ()
- void [expand\\_length](#) (const size\_t start\_pos)
- template<bool single\_word>  
void [expand\\_trans](#) (const size\_t start\_pos, const size\_t end\_pos)

## Friends

- class [stack\\_level](#)

### 8.70.1 Detailed Description

```
template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH>
class uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH,
MAX_M_GRAM_QUERY_LENGTH >
```

This is the translation stack state class that is responsible for the sentence translation

Definition at line 37 of file [stack\\_data.hpp](#).

### 8.70.2 Member Typedef Documentation

8.70.2.1 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> typedef state_data_tmpl<NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH> uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::state_data`

Definition at line 69 of file [stack\\_state.hpp](#).

### 8.70.3 Constructor & Destructor Documentation

8.70.3.1 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::stack_state_tmpl ( const stack_data & data ) [inline]`

The basic constructor for the begin stack state

Parameters

|             |                           |
|-------------|---------------------------|
| <i>data</i> | the shared data container |
|-------------|---------------------------|

Definition at line 75 of file `stack_state.hpp`.

8.70.3.2 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::stack_state_tmpl ( stack_state_ptr parent ) [inline]`

The basic constructor for the end stack state

Parameters

|                     |                                     |
|---------------------|-------------------------------------|
| <i>parent</i>       | the parent state pointer, NOT NULL! |
| <i>prev_history</i> | the previous translation history    |

Definition at line 86 of file `stack_state.hpp`.

8.70.3.3 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::stack_state_tmpl ( stack_state_ptr parent, const int32_t begin_pos, const int32_t end_pos, const typename state_data::covered_info & covered, tm_const_target_entry * target ) [inline]`

The basic constructor for the non-begin/end stack state

Parameters

|                  |                                                        |
|------------------|--------------------------------------------------------|
| <i>parent</i>    | the parent state pointer, NOT NULL!                    |
| <i>begin_pos</i> | this state translated source phrase begin position     |
| <i>end_pos</i>   | this state translated source phrase end position       |
| <i>covered</i>   | the pre-cooked covered vector, for efficiency reasons. |
| <i>target</i>    | the new translation target                             |

Definition at line 100 of file `stack_state.hpp`.

8.70.3.4 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::~~stack_state_tmpl ( ) [inline]`

The basic destructor, should free all the allocated resources. Deletes the states that are recombined into this state as they are not in any stack level

Definition at line 116 of file `stack_state.hpp`.

### 8.70.4 Member Function Documentation

```
8.70.4.1 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::count_and_prune (
 size_t state_count, stack_state_ptr tail) [inline], [protected]
```

Count the number of states in the remaining tail, once the maximum capacity is reached the remaining tail elements are to be deleted.

#### Parameters

|                    |                                                  |
|--------------------|--------------------------------------------------|
| <i>state_count</i> | the number of elements up until the tail element |
| <i>tail</i>        | the pointer to the first tail element            |

Definition at line 391 of file `stack_state.hpp`.

8.70.4.2 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::cut_the_tail ( stack_state_ptr tail ) [inline], [protected]`

Allows to cut the tail of states starting from this one. The states present in the cut tail are to be deleted.

#### Parameters

|             |                               |
|-------------|-------------------------------|
| <i>tail</i> | the tails of states to delete |
|-------------|-------------------------------|

Definition at line 362 of file `stack_state.hpp`.

8.70.4.3 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::expand ( ) [inline]`

Allows the state to expand itself, it will add itself to the proper stack.

Definition at line 154 of file `stack_state.hpp`.

8.70.4.4 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::expand_left ( ) [inline], [protected]`

Expand to the left of the last phrase, for all the possible of start positions

Definition at line 537 of file `stack_state.hpp`.

8.70.4.5 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::expand_length ( const size_t start_pos ) [inline], [protected]`

Allows to expand for all the possible phrase lengths

Definition at line 636 of file `stack_state.hpp`.

8.70.4.6 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::expand_length_if_not_covered ( int32_t & curr_pos, size_t & num_exp ) [inline], [protected]`

Allows to expand the lengths if not the word given by the current position is not covered.

## Parameters

|                 |                                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <i>curr_pos</i> | the reference to the current position, will be decremented by the method by one                                                      |
| <i>num_exp</i>  | the reference to the number of positions we could expand from will be incremented by this method by one if an expansion is possible. |

Definition at line 518 of file `stack_state.hpp`.

```
8.70.4.7 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::expand_right ()
 [inline], [protected]
```

Expand to the right of the last phrase, for all the possible of start positions

Definition at line 593 of file `stack_state.hpp`.

```
8.70.4.8 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH>
 template<bool single_word> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::expand_trans (const
 size_t start_pos, const size_t end_pos) [inline], [protected]
```

Allows to expand for all the possible translations

Definition at line 668 of file `stack_state.hpp`.

```
8.70.4.9 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> uint32_t uva::smt::bpbd::server::decoder::stack::stack_state_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::get_stack_level ()
 const [inline]
```

Allows to get the stack level, the latter is equal to the number of so far translated words.

## Returns

the stack level

Definition at line 145 of file `stack_state.hpp`.

```
8.70.4.10 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::get_translation (
 string & target_sent) const [inline]
```

Allows to get the translation ending in this state.

## Parameters

|                    |                                             |
|--------------------|---------------------------------------------|
| <i>target_sent</i> | [out] the variable to store the translation |
|--------------------|---------------------------------------------|

Definition at line 182 of file `stack_state.hpp`.

```
8.70.4.11 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> bool uva::smt::bpbd::server::decoder::stack::stack_state_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::is_above_threshold (
 const prob_weight & score_bound) const [inline]
```

Allows to check if the given new state is within the threshold limit.

#### Parameters

|                    |                           |
|--------------------|---------------------------|
| <i>score_bound</i> | the bound to compare with |
|--------------------|---------------------------|

#### Returns

true if the state's totl cost is  $\geq$  `score_bound`, otherwise false

Definition at line 289 of file `stack_state.hpp`.

**8.70.4.12** `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::merge_recomb_from ( const stack_state_ptr recomb_from, const size_t recomb_from_count ) [inline], [protected]`

Allows to combine the two recombine from lists together. We combine them into the current list. The states that are remained over are deleted. There remaining states are the ones from both lists that go outside the list capacity. This method must only be called if the `m_recomb_from`  $\neq$  NULL or alternatively `m_recomb_from_count`  $>$  0.

#### Parameters

|                          |                                                   |
|--------------------------|---------------------------------------------------|
| <i>recomb_from</i>       | the recombine from list with at least one element |
| <i>recomb_from_count</i> | the number of elements in the recomb from list    |

Definition at line 415 of file `stack_state.hpp`.

**8.70.4.13** `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> bool uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::operator!= ( const stack_state & other ) const [inline]`

Allows to compare two states for not being equal, this is an inverse of the `==` operator.

#### Parameters

|              |                                 |
|--------------|---------------------------------|
| <i>other</i> | the other state to compare with |
|--------------|---------------------------------|

#### Returns

true if this state is not equal to the other one, otherwise false.

Definition at line 279 of file `stack_state.hpp`.

**8.70.4.14** `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> bool uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::operator< ( const stack_state & other ) const [inline]`

Allows to compare two states, the comparison is based on the state total score. The state with the bigger total score is considered to be bigger, i.e. more probable. The state with the smalle total score is considered to be smaller, i.e. less probable.

#### Parameters

|              |                                 |
|--------------|---------------------------------|
| <i>other</i> | the other state to compare with |
|--------------|---------------------------------|

**Returns**

true if this state is smaller than the other one

Definition at line 223 of file stack\_state.hpp.

```
8.70.4.15 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> bool uva::smt::bpbd::server::decoder::stack::stack_state_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::operator==(const
 stack_state & other) const [inline]
```

Allows to compare two states, the states are equal if they solve the same sub-problem i.e. are eligible for recombination. The states are equal if and only if:

1. They have the same last translated word
2. They have the same history of target words
3. They cover the same source words

**Parameters**

|              |                                 |
|--------------|---------------------------------|
| <i>other</i> | the other state to compare with |
|--------------|---------------------------------|

**Returns**

true if this state is equal to the other one, otherwise false.

Definition at line 251 of file stack\_state.hpp.

```
8.70.4.16 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> void uva::smt::bpbd::server::decoder::stack::stack_state_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::recombine_from (
 stack_state_ptr other_state) [inline]
```

Allows to add a state recombined into this one, i.e. the one equivalent to this one but having the lower value of the total cost. In case this state already has too many states recombined into this one and the new state probability is lower than that of the others, then we just delete it. Also, if there were states recombined into the other one, then they have lower costs, so proper merging of them is to be done as well. Eventually the states recombined into this one must have their m\_recomb\_from arrays empty.

**Parameters**

|                  |                                       |
|------------------|---------------------------------------|
| <i>new_state</i> | the state to recombine into this one. |
|------------------|---------------------------------------|

Definition at line 308 of file stack\_state.hpp.

**8.70.5 Friends And Related Function Documentation**

```
8.70.5.1 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> friend class stack_level [friend]
```

Definition at line 721 of file stack\_state.hpp.

The documentation for this class was generated from the following files:

- inc/server/decoder/stack/[stack\\_data.hpp](#)
- inc/server/decoder/stack/[stack\\_state.hpp](#)



## 8.71 uva::utils::monitor::stat\_monitor Class Reference

```
#include <statistics_monitor.hpp>
```

### Static Public Member Functions

- static void [get\\_mem\\_stat](#) (TMemoryUsage &memStat)
- static double [get\\_cpu\\_time](#) ()

#### 8.71.1 Detailed Description

This class is responsible for monitoring the program statistics, such as the used memory and CPU times. This class is a trivial singleton

Definition at line 66 of file `statistics_monitor.hpp`.

#### 8.71.2 Member Function Documentation

**8.71.2.1** double `uva::utils::monitor::stat_monitor::get_cpu_time ( )` [static]

This function returns the current CPU time as given in the article [http://nadeausoftware.com/articles/2012/03/c\\_c\\_tip\\_how\\_measure\\_cpu\\_time\\_benchmarking](http://nadeausoftware.com/articles/2012/03/c_c_tip_how_measure_cpu_time_benchmarking)

##### Returns

Returns the amount of CPU time used by the current process, in seconds, or -1.0 if an error occurred.

Definition at line 144 of file `statistics_monitor.cpp`.

**8.71.2.2** void `uva::utils::monitor::stat_monitor::get_mem_stat ( TMemoryUsage & memStat )` [static]

Allows to get the current memory usage of the process.

##### Parameters

|                |                                                            |
|----------------|------------------------------------------------------------|
| <i>memStat</i> | this is an out parameter that will store the obtained data |
|----------------|------------------------------------------------------------|

##### Exceptions

|                  |                                                    |
|------------------|----------------------------------------------------|
| <i>Exception</i> | in case the memory statistics can not be obtained. |
|------------------|----------------------------------------------------|

This implementation is derived from [http://locklessinc.com/articles/memory\\_usage/](http://locklessinc.com/articles/memory_usage/) This here is actually C-style code and also pretty ugly.

Definition at line 67 of file `statistics_monitor.cpp`.

The documentation for this class was generated from the following files:

- `inc/common/utils/monitor/statistics_monitor.hpp`
- `src/common/utils/monitor/statistics_monitor.cpp`

## 8.72 uva::smt::bpbd::server::decoder::stack::state\_data\_tmpl< NUM\_WORDS\_PER\_SENTENCE, MAX\_HISTORY\_LENGTH, MAX\_M\_GRAM\_QUERY\_LENGTH > Struct Template Reference

```
#include <state_data.hpp>
```

## Public Types

- typedef [circular\\_queue](#)< [word\\_uid](#), MAX\_M\_GRAM\_QUERY\_LENGTH > [state\\_frame](#)
- typedef [bitset](#)< NUM\_WORDS\_PER\_SENTENCE > [covered\\_info](#)

## Public Member Functions

- [state\\_data\\_tmpl](#) (const [stack\\_data](#) &[stack\\_data](#))
- [state\\_data\\_tmpl](#) (const [state\\_data\\_tmpl](#) &[prev\\_state\\_data](#))
- [state\\_data\\_tmpl](#) (const [state\\_data\\_tmpl](#) &[prev\\_state\\_data](#), const [int32\\_t](#) &[begin\\_pos](#), const [int32\\_t](#) &[end\\_pos](#), const [covered\\_info](#) &[covered](#), [tm\\_const\\_target\\_entry](#) \*[target](#))
- string [covered\\_to\\_string](#) () const

## Public Attributes

- const [stack\\_data](#) &[m\\_stack\\_data](#)
- const [int32\\_t](#) [m\\_s\\_begin\\_word\\_idx](#)
- const [int32\\_t](#) [m\\_s\\_end\\_word\\_idx](#)
- const [phrase\\_length](#) [m\\_stack\\_level](#)
- [tm\\_const\\_target\\_entry](#) \*const [m\\_target](#)
- const [rm\\_entry](#) &[rm\\_entry\\_data](#)
- const [state\\_frame](#) [m\\_trans\\_frame](#)
- [phrase\\_length](#) [m\\_begin\\_lm\\_level](#)
- const [covered\\_info](#) [m\\_covered](#)
- const [prob\\_weight](#) [m\\_partial\\_score](#)
- const [prob\\_weight](#) [m\\_total\\_score](#)

## Static Public Attributes

- static constexpr [int32\\_t](#) [UNDEFINED\\_WORD\\_IDX](#) = -1
- static constexpr [int32\\_t](#) [ZERRO\\_WORD\\_IDX](#) = [UNDEFINED\\_WORD\\_IDX](#) + 1

### 8.72.1 Detailed Description

```
template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH>
H>struct uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH,
TH, MAX_M_GRAM_QUERY_LENGTH >
```

This structure is needed to store the common state data that however changes/mutates from state to state and thus is to be passed on from each state to its child.

Definition at line 65 of file [state\\_data.hpp](#).

### 8.72.2 Member Typedef Documentation

8.72.2.1 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> typedef bitset<NUM_WORDS_PER_SENTENCE> uva::smt::bpbd::server::decoder::stack::state\_data\_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::covered\_info`

Definition at line 70 of file [state\\_data.hpp](#).

```
8.72.2.2 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> typedef circular_queue<word_uid, MAX_M_GRAM_QUERY_LENGTH
 > uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE,
 MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::state_frame
```

Definition at line 67 of file state\_data.hpp.

### 8.72.3 Constructor & Destructor Documentation

```
8.72.3.1 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t
 MAX_M_GRAM_QUERY_LENGTH> uva::smt::bpbd::server::decoder::stack::state_data_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::state_data_tmpl (
 const stack_data & stack_data) [inline]
```

The basic constructor that is to be used for the BEGIN STATE

Parameters

|                                   |                                                                                                                                                             |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#"><i>stack_data</i></a> | the general shared stack data reference                                                                                                                     |
| <i>is_begin_end</i>               | this flag allows to detect whether this data is created for the begin or end tag. If true then it is for the begin tag, if false then it is for the end tag |

Definition at line 83 of file state\_data.hpp.

```
8.72.3.2 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_L
 ENGTH> uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE,
 MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::state_data_tmpl (const state_data_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH > & prev_state_data)
 [inline]
```

The basic constructor that is to be used for the END STATE

Parameters

|                                   |                                                                                                                                                             |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#"><i>stack_data</i></a> | the general shared stack data reference                                                                                                                     |
| <i>is_begin_end</i>               | this flag allows to detect whether this data is created for the begin or end tag. If true then it is for the begin tag, if false then it is for the end tag |

Definition at line 108 of file state\_data.hpp.

```
8.72.3.3 template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_L
 ENGTH> uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE,
 MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::state_data_tmpl (const state_data_tmpl<
 NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH > & prev_state_data,
 const int32_t & begin_pos, const int32_t & end_pos, const covered_info & covered, tm_const_target_entry *
 target) [inline]
```

The basic constructor that is to be used for an INTERMEDIATE STATE data, it takes the parent state data and the new data to be stored/merged with the parent's data.

Parameters

|                   |                                                    |
|-------------------|----------------------------------------------------|
| <i>state_data</i> | the constant reference to the parent state data    |
| <i>begin_pos</i>  | this state translated source phrase begin position |
| <i>end_pos</i>    | this state translated source phrase end position   |

|               |                                                            |
|---------------|------------------------------------------------------------|
| <i>target</i> | the pointer to the target translation of the source phrase |
|---------------|------------------------------------------------------------|

Definition at line 142 of file state\_data.hpp.

## 8.72.4 Member Function Documentation

8.72.4.1 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> string uva::smt::bpbd::server::decoder::stack::state_data_tmpl<NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH>::covered_to_string ( ) const [inline]`

Allows to give the string representation of the covered vector

Returns

the string representation of the covered vector

Definition at line 172 of file state\_data.hpp.

## 8.72.5 Member Data Documentation

8.72.5.1 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> phrase_length uva::smt::bpbd::server::decoder::stack::state_data_tmpl<NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH>::m_begin_lm_level`

Definition at line 212 of file state\_data.hpp.

8.72.5.2 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> const covered_info uva::smt::bpbd::server::decoder::stack::state_data_tmpl<NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH>::m_covered`

Definition at line 215 of file state\_data.hpp.

8.72.5.3 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> const prob_weight uva::smt::bpbd::server::decoder::stack::state_data_tmpl<NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH>::m_partial_score`

Definition at line 218 of file state\_data.hpp.

8.72.5.4 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> const int32_t uva::smt::bpbd::server::decoder::stack::state_data_tmpl<NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH>::m_s_begin_word_idx`

Definition at line 192 of file state\_data.hpp.

8.72.5.5 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> const int32_t uva::smt::bpbd::server::decoder::stack::state_data_tmpl<NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH>::m_s_end_word_idx`

Definition at line 194 of file state\_data.hpp.

8.72.5.6 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> const stack_data& uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::m_stack_data`

Definition at line 189 of file state\_data.hpp.

8.72.5.7 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> const phrase_length uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::m_stack_level`

Definition at line 197 of file state\_data.hpp.

8.72.5.8 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> tm_const_target_entry* const uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::m_target`

Definition at line 200 of file state\_data.hpp.

8.72.5.9 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> const prob_weight uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::m_total_score`

Definition at line 223 of file state\_data.hpp.

8.72.5.10 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> const state_frame uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::m_trans_frame`

Definition at line 209 of file state\_data.hpp.

8.72.5.11 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> const rm_entry& uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::rm_entry_data`

Definition at line 203 of file state\_data.hpp.

8.72.5.12 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> constexpr int32_t uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::UNDEFINED_WORD_IDX = -1 [static]`

Definition at line 73 of file state\_data.hpp.

8.72.5.13 `template<size_t NUM_WORDS_PER_SENTENCE, size_t MAX_HISTORY_LENGTH, size_t MAX_M_GRAM_QUERY_LENGTH> constexpr int32_t uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >::ZERRO_WORD_IDX = UNDEFINED_WORD_IDX + 1 [static]`

Definition at line 74 of file state\_data.hpp.

The documentation for this struct was generated from the following file:

- inc/server/decoder/stack/[state\\_data.hpp](#)

## 8.73 `uva::smt::bpbd::server::lm::m_grams::m_gram_id::T_Gram_Id_Key` Struct Reference

```
#include <m_gram_id.hpp>
```

### Public Attributes

- [TM\\_Gram\\_Id\\_Value\\_Ptr m\\_id](#)
- [uint8\\_t m\\_len\\_bytes](#)

### 8.73.1 Detailed Description

This structure defined the m-gram id key which consists of the m-gram id and its length in bytes

Definition at line 65 of file `m_gram_id.hpp`.

### 8.73.2 Member Data Documentation

#### 8.73.2.1 `TM_Gram_Id_Value_Ptr uva::smt::bpbd::server::lm::m_grams::m_gram_id::T_Gram_Id_Key::m_id`

Definition at line 66 of file `m_gram_id.hpp`.

#### 8.73.2.2 `uint8_t uva::smt::bpbd::server::lm::m_grams::m_gram_id::T_Gram_Id_Key::m_len_bytes`

Definition at line 67 of file `m_gram_id.hpp`.

The documentation for this struct was generated from the following file:

- [inc/server/lm/mgrams/m\\_gram\\_id.hpp](#)

## 8.74 `uva::utils::containers::utils::T_IS_COMPARE_FUNC< ELEM_TYPE >` Struct Template Reference

```
#include <array_utils.hpp>
```

### Public Types

- `typedef std::function< bool(const ELEM_TYPE &, const ELEM_TYPE &) >` [func\\_type](#)
- `typedef bool(* func\_ptr) (const ELEM_TYPE &, const ELEM_TYPE &)`

### 8.74.1 Detailed Description

```
template<typename ELEM_TYPE>struct uva::utils::containers::utils::T_IS_COMPARE_FUNC< ELEM_TYPE >
```

Define the function type for the comparison function

Definition at line 50 of file `array_utils.hpp`.

## 8.74.2 Member Typedef Documentation

8.74.2.1 `template<typename ELEM_TYPE> typedef bool(* uva::utils::containers::utils::T_IS_COMPARE_FUNC< ELEM_TYPE >::func_ptr) (const ELEM_TYPE &, const ELEM_TYPE &)`

Definition at line 52 of file `array_utils.hpp`.

8.74.2.2 `template<typename ELEM_TYPE> typedef std::function<bool(const ELEM_TYPE &, const ELEM_TYPE &) > uva::utils::containers::utils::T_IS_COMPARE_FUNC< ELEM_TYPE >::func_type`

Definition at line 51 of file `array_utils.hpp`.

The documentation for this struct was generated from the following file:

- `inc/common/utils/containers/array_utils.hpp`

## 8.75 `uva::smt::bpbd::server::lm::arpa::TAddGramFunc< WordIndexType >` Struct Template Reference

```
#include <lm_gram_builder.hpp>
```

### Public Types

- `typedef std::function< void(const model\_m\_gram &) > func`

### 8.75.1 Detailed Description

```
template<typename WordIndexType> struct uva::smt::bpbd::server::lm::arpa::TAddGramFunc< WordIndexType >
```

Definition at line 50 of file `lm_gram_builder.hpp`.

## 8.75.2 Member Typedef Documentation

8.75.2.1 `template<typename WordIndexType> typedef std::function<void (const model\_m\_gram&) > uva::smt::bpbd::server::lm::arpa::TAddGramFunc< WordIndexType >::func`

Definition at line 51 of file `lm_gram_builder.hpp`.

The documentation for this struct was generated from the following file:

- `inc/server/lm/builders/lm_gram_builder.hpp`

## 8.76 `uva::smt::bpbd::server::lm::__C2WArrayTrie::TCtxIdProbData` Struct Reference

```
#include <c2w_array_trie.hpp>
```

### Public Attributes

- `TShortId word_id`
- `TShortId ctx_id`
- `prob_weight prob`

### 8.76.1 Detailed Description

Stores the information about the context id, word id and corresponding probability This data structure is to be used for the N-Gram data, as there are no back-offs It is used to store the N-gram data for the last Trie level N.

#### Parameters

|                |                      |
|----------------|----------------------|
| <i>ctx_id</i>  | the context id       |
| <i>word_id</i> | the word id          |
| <i>prob</i>    | the probability data |

Definition at line 81 of file `c2w_array_trie.hpp`.

### 8.76.2 Member Data Documentation

#### 8.76.2.1 TShortId uva::smt::bpbd::server::lm::\_\_C2WArrayTrie::TCtxIdProbData::ctx\_id

Definition at line 83 of file `c2w_array_trie.hpp`.

#### 8.76.2.2 prob\_weight uva::smt::bpbd::server::lm::\_\_C2WArrayTrie::TCtxIdProbData::prob

Definition at line 84 of file `c2w_array_trie.hpp`.

#### 8.76.2.3 TShortId uva::smt::bpbd::server::lm::\_\_C2WArrayTrie::TCtxIdProbData::word\_id

Definition at line 82 of file `c2w_array_trie.hpp`.

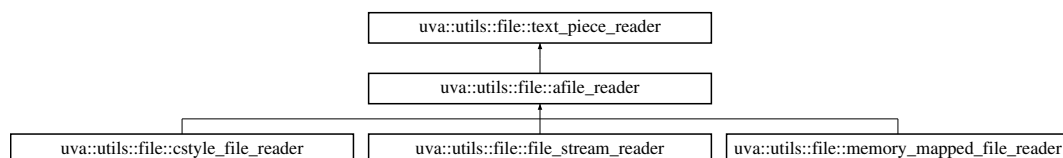
The documentation for this struct was generated from the following file:

- [inc/server/lm/models/c2w\\_array\\_trie.hpp](#)

## 8.77 uva::utils::file::text\_piece\_reader Class Reference

```
#include <text_piece_reader.hpp>
```

Inheritance diagram for `uva::utils::file::text_piece_reader`:



### Public Member Functions

- [text\\_piece\\_reader](#) ()
- [text\\_piece\\_reader](#) (const void \*begin\_ptr, const size\_t len)
- [text\\_piece\\_reader](#) (const [text\\_piece\\_reader](#) &other)
- void [set](#) (const void \*begin\_ptr, const size\_t len)
- const char \* [get\\_begin\\_c\\_str](#) () const
- const char \* [get\\_rest\\_c\\_str](#) () const
- string [get\\_rest\\_str](#) () const
- const void \* [get\\_begin\\_ptr](#) () const
- size\_t [length](#) () const



- template<const size\_t LEN\_LIMIT>  
void [copy\\_string](#) (const [text\\_piece\\_reader](#) &other)
- template<const char delim, const uint8\_t delim\_len = 1>  
bool [get\\_first](#) ([text\\_piece\\_reader](#) &out)
- template<const char delim, const uint8\_t delim\_card = 1>  
bool [get\\_last](#) ([text\\_piece\\_reader](#) &out)
- bool [has\\_more](#) ()
- bool [get\\_first\\_line](#) ([text\\_piece\\_reader](#) &out)
- bool [get\\_first\\_space](#) ([text\\_piece\\_reader](#) &out)
- bool [get\\_last\\_space](#) ([text\\_piece\\_reader](#) &out)
- bool [get\\_first\\_tab](#) ([text\\_piece\\_reader](#) &out)
- char [operator\[\]](#) (size\_t idx)
- bool [operator==](#) (const [text\\_piece\\_reader](#) &other) const
- bool [operator!=](#) (const [text\\_piece\\_reader](#) &other) const
- bool [operator==](#) (const char \*other) const
- bool [operator!=](#) (const char \*other) const
- bool [operator==](#) (const string &other) const
- bool [operator!=](#) (const string &other) const
- const string & [str](#) () const

## Protected Member Functions

- template<const char delim, const uint8\_t delim\_len>  
const char \* [find\\_first\\_subseq](#) ()

### 8.77.1 Detailed Description

This basic storage class that stores the pointer to pre-allocated memory plus the length of this piece. This class can be used to represent a piece of text, a line or a word or any arbitrary piece of memory. Note that, the string here is not necessarily \0 terminated and the text memory can be Gb large! Also the memory is not managed by the class.

Definition at line 61 of file [text\\_piece\\_reader.hpp](#).

### 8.77.2 Constructor & Destructor Documentation

#### 8.77.2.1 [uva::utils::file::text\\_piece\\_reader::text\\_piece\\_reader \( \)](#) [\[inline\]](#)

The basic constructor initializes empty text

Definition at line 84 of file [text\\_piece\\_reader.hpp](#).

#### 8.77.2.2 [uva::utils::file::text\\_piece\\_reader::text\\_piece\\_reader \( const void \\* \*begin\\_ptr\*, const size\\_t \*len\* \)](#) [\[inline\]](#), [\[explicit\]](#)

The constructor.

Parameters

|                 |                                      |
|-----------------|--------------------------------------|
| <i>beginPtr</i> | the pointer to the begin of the text |
| <i>len</i>      | the length of the text               |

Definition at line 93 of file [text\\_piece\\_reader.hpp](#).

#### 8.77.2.3 [uva::utils::file::text\\_piece\\_reader::text\\_piece\\_reader \( const \[text\\\_piece\\\_reader\]\(#\) & \*other\* \)](#) [\[inline\]](#)

The copy constructor.

## Parameters

|              |                                                |
|--------------|------------------------------------------------|
| <i>other</i> | the const reference to the object to copy from |
|--------------|------------------------------------------------|

Definition at line 102 of file text\_piece\_reader.hpp.

### 8.77.3 Member Function Documentation

**8.77.3.1** `template<const size_t LEN_LIMIT> void uva::utils::file::text_piece_reader::copy_string ( const text_piece_reader & other ) [inline]`

This method allows to copy the string of one text piece into another. The copying process re-sets the internal cursor and remaining length to read.

## Parameters

|              |                                                                                                                               |
|--------------|-------------------------------------------------------------------------------------------------------------------------------|
| <i>other</i> | the element to copy from                                                                                                      |
| <i>limit</i> | the maximum length allowed to be copied from the source (other) if the source length is larger - an exception will be raised! |

Definition at line 185 of file text\_piece\_reader.hpp.

**8.77.3.2** `template<const char delim, const uint8_t delim_len> const char* uva::utils::file::text_piece_reader::find_first_subseq ( ) [inline], [protected]`

Allows to find a sub-sequence of characters in the forward manner

## Returns

the pointer to the last character in the subsequence or NULL if nothing is found

Definition at line 512 of file text\_piece\_reader.hpp.

**8.77.3.3** `const char* uva::utils::file::text_piece_reader::get_begin_c_str ( ) const [inline]`

Allows to get the pointer to the beginning of the text This is a C string that is returned BUT there is no \0 termination and it can be Gb long!

## Returns

the pointer to the beginning of the text

Definition at line 137 of file text\_piece\_reader.hpp.

**8.77.3.4** `const void* uva::utils::file::text_piece_reader::get_begin_ptr ( ) const [inline]`

Allows to get the pointer to the beginning of the text

## Returns

the pointer to the beginning of the text

Definition at line 165 of file text\_piece\_reader.hpp.

**8.77.3.5** `template<const char delim, const uint8_t delim_len = 1> bool uva::utils::file::text_piece_reader::get_first ( text_piece_reader & out ) [inline]`

This function searches forward for the first occurrence of the argument delimiter symbol.

## Parameters

|                  |                                                                                                                            |
|------------------|----------------------------------------------------------------------------------------------------------------------------|
| <i>delim</i>     | the delimiter we are looking for                                                                                           |
| <i>delim_len</i> | the number of times in a row the delimiter shall occur, default is 1                                                       |
| <i>out</i>       | the out parameter - the substring until the first next found delimiter or the entire string if the delimiter was not found |

## Returns

true if a text piece was read, otherwise false (end of file)

Definition at line 211 of file text\_piece\_reader.hpp.

**8.77.3.6** `bool uva::utils::file::text_piece_reader::get_first_line ( text_piece_reader & out ) [inline]`

This function, searches forward for the first end of line char or until the end of the text and then sets the data about the found region into the provided output parameter.

## Parameters

|            |                                   |
|------------|-----------------------------------|
| <i>out</i> | the out parameter - the read line |
|------------|-----------------------------------|

## Returns

true if data was read, otherwise false

Definition at line 353 of file text\_piece\_reader.hpp.

**8.77.3.7** `bool uva::utils::file::text_piece_reader::get_first_space ( text_piece_reader & out ) [inline]`

This function, searches forward for the first space char or until the end of the text and then sets the data about the found region into the provided output parameter.

## Parameters

|            |                                   |
|------------|-----------------------------------|
| <i>out</i> | the out parameter - the read line |
|------------|-----------------------------------|

## Returns

true if data was read, otherwise false

Definition at line 366 of file text\_piece\_reader.hpp.

**8.77.3.8** `bool uva::utils::file::text_piece_reader::get_first_tab ( text_piece_reader & out ) [inline]`

This function, searches forward for the first end of tab char or until the end of the text and then sets the data about the found region into the provided output parameter.

## Parameters

|            |                                   |
|------------|-----------------------------------|
| <i>out</i> | the out parameter - the read line |
|------------|-----------------------------------|

## Returns

true if data was read, otherwise false

Definition at line 393 of file text\_piece\_reader.hpp.

8.77.3.9 `template<const char delim, const uint8_t delim_card = 1> bool uva::utils::file::text_piece_reader::get_last (`  
`text_piece_reader & out ) [inline]`

This function searches backwards for the first occurrence of the argument delimiter symbol.

## Parameters

|                   |                                                                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>delim</i>      | the delimiter we are looking for                                                                                                                     |
| <i>delim_card</i> | the number of times in a row the delimiter shall occur, default is 1                                                                                 |
| <i>out</i>        | the out parameter - the substring from the first next found delimiter till the end of the string or the entire string if the delimiter was not found |

## Returns

true if a line was read, otherwise false (end of file)

Definition at line 287 of file text\_piece\_reader.hpp.

#### 8.77.3.10 bool uva::utils::file::text\_piece\_reader::get\_last\_space ( text\_piece\_reader & out ) [inline]

This function, from the end position, searches for the space char or until the beginning of the text and then sets the data about the found region into the provided output parameter. I.e. we get a sub-string: [begin\_index, last\_↵ space\_idx)

## Parameters

|            |                                   |
|------------|-----------------------------------|
| <i>out</i> | the out parameter - the read line |
|------------|-----------------------------------|

## Returns

true if data was read, otherwise false

Definition at line 380 of file text\_piece\_reader.hpp.

#### 8.77.3.11 const char\* uva::utils::file::text\_piece\_reader::get\_rest\_c\_str ( ) const [inline]

Allows to get the pointer to the remainder of the text This is a C string that is returned BUT there is no \0 termination and it can be Gb long!

## Returns

the pointer to the remainder of the text

Definition at line 147 of file text\_piece\_reader.hpp.

#### 8.77.3.12 string uva::utils::file::text\_piece\_reader::get\_rest\_str ( ) const [inline]

Allows to get the pointer to the remainder of the text This is a C string that is returned BUT there is no \0 termination and it can be Gb long!

## Returns

the pointer to the remainder of the text

Definition at line 157 of file text\_piece\_reader.hpp.

#### 8.77.3.13 bool uva::utils::file::text\_piece\_reader::has\_more ( ) [inline]

Allows to check if there is something left to read

## Returns

true if there is yet something to read, otherwise false

Definition at line 342 of file text\_piece\_reader.hpp.

**8.77.3.14** `size_t uva::utils::file::text_piece_reader::length ( ) const [inline]`

Allows to get the length of the text

Returns

the length of the text

Definition at line 173 of file `text_piece_reader.hpp`.

**8.77.3.15** `bool uva::utils::file::text_piece_reader::operator!= ( const text_piece_reader & other ) const [inline]`

The comparison operator implementation

Parameters

|              |                            |
|--------------|----------------------------|
| <i>other</i> | text piece to compare with |
|--------------|----------------------------|

Definition at line 434 of file `text_piece_reader.hpp`.

**8.77.3.16** `bool uva::utils::file::text_piece_reader::operator!= ( const char * other ) const [inline]`

The comparison operator implementation

Parameters

|              |                                         |
|--------------|-----------------------------------------|
| <i>other</i> | a <code>c_string</code> to compare with |
|--------------|-----------------------------------------|

Definition at line 457 of file `text_piece_reader.hpp`.

**8.77.3.17** `bool uva::utils::file::text_piece_reader::operator!= ( const string & other ) const [inline]`

The comparison operator implementation

Parameters

|              |                                         |
|--------------|-----------------------------------------|
| <i>other</i> | a <code>c_string</code> to compare with |
|--------------|-----------------------------------------|

Definition at line 475 of file `text_piece_reader.hpp`.

**8.77.3.18** `bool uva::utils::file::text_piece_reader::operator== ( const text_piece_reader & other ) const [inline]`

The comparison operator implementation

Parameters

|              |                            |
|--------------|----------------------------|
| <i>other</i> | text piece to compare with |
|--------------|----------------------------|

Definition at line 421 of file `text_piece_reader.hpp`.

**8.77.3.19** `bool uva::utils::file::text_piece_reader::operator== ( const char * other ) const [inline]`

The comparison operator implementation

Parameters

---

|              |                            |
|--------------|----------------------------|
| <i>other</i> | a c_string to compare with |
|--------------|----------------------------|

Definition at line 443 of file `text_piece_reader.hpp`.

8.77.3.20 `bool uva::utils::file::text_piece_reader::operator==( const string & other ) const` `[inline]`

The comparison operator implementation

Parameters

|              |                            |
|--------------|----------------------------|
| <i>other</i> | a c_string to compare with |
|--------------|----------------------------|

Definition at line 466 of file `text_piece_reader.hpp`.

8.77.3.21 `char uva::utils::file::text_piece_reader::operator[]( size_t idx )` `[inline]`

Allows to get the character at the given index, if the index stays within the text length bounds.

Parameters

|            |                     |
|------------|---------------------|
| <i>idx</i> | the character index |
|------------|---------------------|

Returns

Definition at line 405 of file `text_piece_reader.hpp`.

8.77.3.22 `void uva::utils::file::text_piece_reader::set( const void * begin_ptr, const size_t len )` `[inline]`

Allows to set the text

Parameters

|                 |                                          |
|-----------------|------------------------------------------|
| <i>beginPtr</i> | the pointer to the beginning of the text |
| <i>len</i>      | the length of the text                   |

Definition at line 116 of file `text_piece_reader.hpp`.

8.77.3.23 `const string& uva::utils::file::text_piece_reader::str( ) const` `[inline]`

Allows to convert the line to string object

Returns

the resulting line

Definition at line 484 of file `text_piece_reader.hpp`.

The documentation for this class was generated from the following file:

- [inc/common/utils/file/text\\_piece\\_reader.hpp](#)

## 8.78 `uva::smt::bpbd::server::tm::builders::tm_basic_builder< model_type, reader_type >` Class Template Reference

```
#include <tm_basic_builder.hpp>
```

## Public Member Functions

- [tm\\_basic\\_builder](#) (const [tm\\_parameters](#) &params, model\_type &model, reader\_type &reader)
- [~tm\\_basic\\_builder](#) ()
- void [build](#) ()

## Protected Member Functions

- float [post\\_process\\_feature](#) (const float feature, const float lambda)
- template<bool is\_get\_weights>  
bool [process\\_features](#) ([text\\_piece\\_reader](#) weights, size\_t &num\_features, [prob\\_weight](#) \*storage)
- bool [is\\_good\\_features](#) ([text\\_piece\\_reader](#) rest, size\_t &tmp\_features\_size, [prob\\_weight](#) \*tmp\_features)
- void [process\\_target\\_entry](#) ([tm\\_source\\_entry](#) \*source\_entry, [text\\_piece\\_reader](#) &rest, size\_t &count\_ref, size\_t &tmp\_features\_size, [prob\\_weight](#) \*tmp\_features)
- template<bool count\_or\_build>  
void [parse\\_tm\\_file](#) ()
- void [count\\_source\\_phrases](#) ()
- void [process\\_source\\_entries](#) ()
- void [add\\_unk\\_translation](#) ()

### 8.78.1 Detailed Description

```
template<typename model_type, typename reader_type>class uva::smt::bpbd::server::tm::builders::tm_basic_builder<
model_type, reader_type >
```

This class represents a basic reader of the translation model. It allows to read a text-formatted translation model and to put it into the given instance of the model class. It assumes the simple text model format as used by Oyster or Moses. See <http://www.statmt.org/moses/?n=Moses.Tutorial> for some info. The translation model is also commonly known as a phrase table.

Definition at line 84 of file `tm_basic_builder.hpp`.

### 8.78.2 Constructor & Destructor Documentation

8.78.2.1 `template<typename model_type , typename reader_type > uva::smt::bpbd::server::tm::builders::tm_↵  
basic_builder< model_type, reader_type >::tm_basic_builder ( const tm_parameters & params, model_type  
& model, reader_type & reader ) [inline]`

The basic constructor of the builder object params the model parameters

#### Parameters

|               |                                  |
|---------------|----------------------------------|
| <i>model</i>  | the model to put the data into   |
| <i>reader</i> | the reader to read the data from |

Definition at line 93 of file `tm_basic_builder.hpp`.

8.78.2.2 `template<typename model_type , typename reader_type > uva::smt::bpbd::server::tm_↵  
::builders::tm_basic_builder< model_type, reader_type >::~~tm_basic_builder ( )  
[inline]`

The basic destructor

Definition at line 103 of file `tm_basic_builder.hpp`.



### 8.78.3 Member Function Documentation

8.78.3.1 `template<typename model_type , typename reader_type > void uva::smt::bpbd::server::tm::builders::tm_basic_builder< model_type, reader_type >::add_unk_translation ( ) [inline], [protected]`

Allows to add an unk entry to the model

Definition at line 447 of file tm\_basic\_builder.hpp.

8.78.3.2 `template<typename model_type , typename reader_type > void uva::smt::bpbd::server::tm::builders::tm_basic_builder< model_type, reader_type >::build ( ) [inline]`

Allows to build the model by reading from the reader object. This is a two step process as first we need the number of distinct source phrases.

Definition at line 113 of file tm\_basic\_builder.hpp.

8.78.3.3 `template<typename model_type , typename reader_type > void uva::smt::bpbd::server::tm::builders::tm_basic_builder< model_type, reader_type >::count_source_phrases ( ) [inline], [protected]`

Allows to count and set the number of source phrases

Definition at line 413 of file tm\_basic\_builder.hpp.

8.78.3.4 `template<typename model_type , typename reader_type > bool uva::smt::bpbd::server::tm::builders::tm_basic_builder< model_type, reader_type >::is_good_features ( text_piece_reader rest, size_t & tmp_features_size, prob_weight * tmp_features ) [inline], [protected]`

Allows to check if whether the probability weights satisfy the filtering thresholds.

Parameters

|                     |                                                                    |
|---------------------|--------------------------------------------------------------------|
| <i>rest</i>         | the part of the source entry containing the target and the weights |
| <i>tmp_features</i> | the temporary weights storage                                      |

Returns

true if the conditions are satisfied, otherwise false

Definition at line 207 of file tm\_basic\_builder.hpp.

8.78.3.5 `template<typename model_type , typename reader_type > template<bool count_or_build> void uva::smt::bpbd::server::tm::builders::tm_basic_builder< model_type, reader_type >::parse_tm_file ( ) [inline], [protected]`

Allows to parse the TM model file and do two things depending on the value of the template parameter:

1. Count the number of valid entries
2. Build the TM model NOTE: This two pass parsing is not optimal but we have to do it as we need to know the number of valid entries beforehand, an optimization might be needed!

## Parameters

|                       |                                        |
|-----------------------|----------------------------------------|
| <i>count_or_build</i> | if true then count if false then build |
|-----------------------|----------------------------------------|

Definition at line 291 of file tm\_basic\_builder.hpp.

```
8.78.3.6 template<typename model_type , typename reader_type > float uva::smt::bpbd::server::tm::builders::tm_↵
basic_builder< model_type, reader_type >::post_process_feature (const float feature, const float lambda)
[inline], [protected]
```

Allows to post-process a single feature, i.e. do: log10(feature)\*lambda

## Parameters

|                |                                                      |
|----------------|------------------------------------------------------|
| <i>feature</i> | the feature to post-process                          |
| <i>lambda</i>  | the lambda weight to multiply the log10 feature with |

## Returns

the post-processed feature

Definition at line 135 of file tm\_basic\_builder.hpp.

```
8.78.3.7 template<typename model_type , typename reader_type > template<bool is_get_weights> bool
uva::smt::bpbd::server::tm::builders::tm_basic_builder< model_type, reader_type >::process_features (
text_piece_reader weights, size_t & num_features, prob_weight * storage) [inline], [protected]
```

Allows to extract the features from the text piece and to check that they are valid with respect to the option bound If needed the weights will be converted to log scale and multiplied with the lambda factors

## Parameters

|                       |                                                                                        |
|-----------------------|----------------------------------------------------------------------------------------|
| <i>is_get_weights</i> | if the weights are to be retrieved or just checked                                     |
| <i>weights</i>        | [in] the text piece with weights, that starts with a space!                            |
| <i>num_features</i>   | [out] the number of read features if they satisfy on the constraints                   |
| <i>storage</i>        | [out] the read and post-processed features features if they satisfy on the constraints |

## Returns

true if the features satisfy the constraints, otherwise false

Definition at line 154 of file tm\_basic\_builder.hpp.

```
8.78.3.8 template<typename model_type , typename reader_type > void uva::smt::bpbd::server::tm_↵
::builders::tm_basic_builder< model_type, reader_type >::process_source_entries () [inline],
[protected]
```

Allows to process translations.

Definition at line 434 of file tm\_basic\_builder.hpp.

```
8.78.3.9 template<typename model_type , typename reader_type > void uva::smt::bpbd::server::tm::builders_↵
::tm_basic_builder< model_type, reader_type >::process_target_entry (tm_source_entry * source_entry,
text_piece_reader & rest, size_t & count_ref, size_t & tmp_features_size, prob_weight * tmp_features)
[inline], [protected]
```

The line format assumes source to target and then at least four weights as given by: <http://www.statmt.org/moses/?n=FactoredTraining.ScorePhrases> Currently, four different phrase translation scores

are computed: inverse phrase translation probability  $\phi(f|e)$  inverse lexical weighting  $\text{lex}(f|e)$  direct phrase translation probability  $\phi(e|f)$  direct lexical weighting  $\text{lex}(e|f)$  Previously, there was another score: phrase penalty (always  $\exp(1) = 2.718$ ) The latter is considered optional, all the other elements followed on the translation line are now skipped.

#### Parameters

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <i>source_entry</i>       | the pointer to the source entry for which this translation is |
| <i>rest</i>               | stores the line to be parsed into a translation entry         |
| <i>count_ref</i>          | [in/out] the number of remaining entries                      |
| <i>tmp_features_↔size</i> | [out] the number of read features                             |
| <i>tmp_features</i>       | the temporary feature storage                                 |

Definition at line 235 of file `tm_basic_builder.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/tm/builders/tm_basic_builder.hpp`

## 8.79 uva::smt::bpbd::server::tm::models::tm\_basic\_model Class Reference

```
#include <tm_basic_model.hpp>
```

### Public Types

- typedef `fixed_size_hashmap< tm_source_entry, const phrase_uid & >` `tm_source_entry_map`

### Public Member Functions

- `tm_basic_model()`
- `~tm_basic_model()`
- void `set_unk_entry` (`word_uid` unk\_word\_id, const `size_t` num\_unk\_features, `feature_array` unk\_features, const `prob_weight` lm\_weight)
- bool `is_num_entries_needed` () const
- void `set_num_entries` (const `size_t` num\_entries)
- `tm_source_entry` \* `begin_entry` (const `phrase_uid` entry\_id, const `size_t` num\_elems)
- void `finalize_entry` (const `phrase_uid` entry\_id)
- void `finalize` ()
- template<bool do\_unk>  
    `tm_const_source_entry` \* `get_source_entry` (const `phrase_uid` entry\_id) const
- bool `is_unk_entry` (`tm_const_source_entry` \*entry) const
- void `log_model_type_info` () const

### 8.79.1 Detailed Description

This class represents a basic translation model implementation. The basic model is based on the fixed size hash map which is a self-implemented linear probing hash map also used in several tries. This basic model also does not store the phrases as is but rather the hash values thereof. So it is a hash based implementation which reduces memory but might occasionally result in collisions, the latter is not checked.

Definition at line 65 of file `tm_basic_model.hpp`.

## 8.79.2 Member Typedef Documentation

8.79.2.1 `typedef fixed_size_hashmap<tm_source_entry, const phrase_uid >  
uva::smt::bpbd::server::tm::models::tm_basic_model::tm_source_entry_map`

Definition at line 68 of file `tm_basic_model.hpp`.

## 8.79.3 Constructor & Destructor Documentation

8.79.3.1 `uva::smt::bpbd::server::tm::models::tm_basic_model::tm_basic_model ( ) [inline]`

The basic class constructor

Definition at line 73 of file `tm_basic_model.hpp`.

8.79.3.2 `uva::smt::bpbd::server::tm::models::tm_basic_model::~~tm_basic_model ( ) [inline]`

The basic destructor

Definition at line 79 of file `tm_basic_model.hpp`.

## 8.79.4 Member Function Documentation

8.79.4.1 `tm_source_entry* uva::smt::bpbd::server::tm::models::tm_basic_model::begin_entry ( const phrase_uid  
entry_id, const size_t num_elems ) [inline]`

Allows to open a new source entry, i.e. the entry for the new source phrase

Parameters

|                 |                                                           |
|-----------------|-----------------------------------------------------------|
| <i>entry_id</i> | the source phrase id for which the entry is to be started |
|-----------------|-----------------------------------------------------------|

Returns

the entry associated with the given id

Definition at line 158 of file `tm_basic_model.hpp`.

8.79.4.2 `void uva::smt::bpbd::server::tm::models::tm_basic_model::finalize ( ) [inline]`

This method is to be called when the translation model is fully read

Definition at line 200 of file `tm_basic_model.hpp`.

8.79.4.3 `void uva::smt::bpbd::server::tm::models::tm_basic_model::finalize_entry ( const phrase_uid entry_id )  
[inline]`

Allows to finish an entry with the given id. The process of finishing might include many things but the purpose of it is to indicate that the source entry has been fully read. I.e. all the translations for the given source are processed.

Parameters

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| <i>entry_id</i> | the source phrase id for which the entry is to be finished. |
|-----------------|-------------------------------------------------------------|

Definition at line 188 of file `tm_basic_model.hpp`.

8.79.4.4 `template<bool do_unk> tm_const_source_entry* uva::smt::bpbd::server::tm::models::tm_basic_model::get_↵  
source_entry ( const phrase_uid entry_id ) const [inline]`

Allows to get the source entry for the given entry id

**Parameters**

|                 |                                                                                                                                            |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <i>do_unk</i>   | if true then if the entry is not present we return UNK if false then if the entry is not present we return NULL The default value is true. |
| <i>entry_id</i> | the source phrase id                                                                                                                       |

**Returns**

the source phrase entry or UNK if the entry is not found

Definition at line 213 of file tm\_basic\_model.hpp.

**8.79.4.5** `bool uva::smt::bpbd::server::tm::models::tm_basic_model::is_num_entries_needed ( ) const [inline]`

This method allows to detect if the number of entries (source phrases) is needed before the translation entries are being added.

**Returns**

true as this model type uses fixed-size hash maps

Definition at line 136 of file tm\_basic\_model.hpp.

**8.79.4.6** `bool uva::smt::bpbd::server::tm::models::tm_basic_model::is_unk_entry ( tm_const_source_entry * entry ) const [inline]`

Allows to check in the given entry is the UNK entry

**Parameters**

|              |                                       |
|--------------|---------------------------------------|
| <i>entry</i> | the pointer to the entry to be tested |
|--------------|---------------------------------------|

**Returns**

true if this is an UNK entry otherwise false

Definition at line 229 of file tm\_basic\_model.hpp.

**8.79.4.7** `void uva::smt::bpbd::server::tm::models::tm_basic_model::log_model_type_info ( ) const [inline]`

Allows to log the model type info

Definition at line 236 of file tm\_basic\_model.hpp.

**8.79.4.8** `void uva::smt::bpbd::server::tm::models::tm_basic_model::set_num_entries ( const size_t num_entries ) [inline]`

This method is needed to set the number of source phrase entries This is to be done before adding the translation entries to the model The memory of the map will be allocated by this class.

**Parameters**

|                    |                                     |
|--------------------|-------------------------------------|
| <i>num_entries</i> | the number of source phrase entries |
|--------------------|-------------------------------------|

Definition at line 146 of file tm\_basic\_model.hpp.

8.79.4.9 void uva::smt::bpbd::server::tm::models::tm\_basic\_model::set\_unk\_entry ( word\_uid *unk\_word\_id*, const size\_t *num\_unk\_features*, feature\_array *unk\_features*, const prob\_weight *lm\_weight* ) [inline]

Should be called to add the unk entry to the model

## Parameters

|                         |                                                            |
|-------------------------|------------------------------------------------------------|
| <i>unk_word_id</i>      | the unknown word id from the Language Model                |
| <i>num_unk_features</i> | the number of initialized unk features                     |
| <i>unk_features</i>     | the unk entry features                                     |
| <i>lm_weight</i>        | the cost of the target (UNK) translation from the LM model |

Definition at line 100 of file tm\_basic\_model.hpp.

The documentation for this class was generated from the following file:

- inc/server/tm/models/tm\_basic\_model.hpp

## 8.80 uva::smt::bpbd::server::tm::tm\_configurator Class Reference

```
#include <tm_configurator.hpp>
```

### Static Public Member Functions

- static void [connect](#) (const [tm\\_parameters](#) &params)
- static void [disconnect](#) ()
- static [tm\\_query\\_proxy](#) & [allocate\\_query\\_proxy](#) ()
- static void [dispose\\_query\\_proxy](#) ([tm\\_query\\_proxy](#) &query)

### 8.80.1 Detailed Description

This class represents a singleton that allows to configure the translation model and then issue a proxy object for performing the queries against it.

Definition at line 52 of file tm\_configurator.hpp.

### 8.80.2 Member Function Documentation

**8.80.2.1** static [tm\\_query\\_proxy](#)& [uva::smt::bpbd::server::tm::tm\\_configurator::allocate\\_query\\_proxy](#) ( ) [\[inline\]](#), [\[static\]](#)

Allows to return an instance of the query proxy, is to be returned by calling the dispose method.

#### Returns

an instance of the query executor.

Definition at line 91 of file tm\_configurator.hpp.

**8.80.2.2** static void [uva::smt::bpbd::server::tm::tm\\_configurator::connect](#) ( const [tm\\_parameters](#) & *params* ) [\[inline\]](#), [\[static\]](#)

This method allows to connect to the translation model. This method is to be called only once! The latter is not checked but is a must.



## Parameters

|               |                                                                                                    |
|---------------|----------------------------------------------------------------------------------------------------|
| <i>params</i> | the translation model parameters to be set, this class only stores the referent to the parameters. |
|---------------|----------------------------------------------------------------------------------------------------|

Definition at line 62 of file tm\_configurator.hpp.

### 8.80.2.3 static void uva::smt::bpbd::server::tm::tm\_configurator::disconnect ( ) `[inline], [static]`

Allows to disconnect from the translation model.

Definition at line 76 of file tm\_configurator.hpp.

### 8.80.2.4 static void uva::smt::bpbd::server::tm::tm\_configurator::dispose\_query\_proxy ( tm\_query\_proxy & query ) `[inline], [static]`

Dispose the previously allocated query object

## Parameters

|              |                      |
|--------------|----------------------|
| <i>query</i> | the query to dispose |
|--------------|----------------------|

Definition at line 102 of file tm\_configurator.hpp.

The documentation for this class was generated from the following files:

- [inc/server/tm/tm\\_configurator.hpp](#)
- [src/server/tm/tm\\_configurator.cpp](#)

## 8.81 uva::smt::bpbd::server::tm::tm\_parameters Struct Reference

```
#include <tm_parameters.hpp>
```

### Public Member Functions

- void [finalize](#) ()

### Public Attributes

- string [m\\_conn\\_string](#)
- size\_t [m\\_num\\_lambdas](#)
- float [m\\_lambdas](#) [NUM\_TM\_FEATURES]
- size\_t [m\\_num\\_unk\\_features](#)
- float [m\\_unk\\_features](#) [NUM\_TM\_FEATURES]
- size\_t [m\\_trans\\_limit](#)
- float [m\\_min\\_tran\\_prob](#)

### 8.81.1 Detailed Description

This structure stores the translation model parameters

Definition at line 53 of file tm\_parameters.hpp.

## 8.81.2 Member Function Documentation

### 8.81.2.1 void uva::smt::bpbd::server::tm::tm\_parameters::finalize ( ) [inline]

Allows to verify the parameters to be correct.

Definition at line 82 of file tm\_parameters.hpp.

## 8.81.3 Member Data Documentation

### 8.81.3.1 string uva::smt::bpbd::server::tm::tm\_parameters::m\_conn\_string

Definition at line 55 of file tm\_parameters.hpp.

### 8.81.3.2 float uva::smt::bpbd::server::tm::tm\_parameters::m\_lambdas[NUM\_TM\_FEATURES]

Definition at line 61 of file tm\_parameters.hpp.

### 8.81.3.3 float uva::smt::bpbd::server::tm::tm\_parameters::m\_min\_tran\_prob

Definition at line 77 of file tm\_parameters.hpp.

### 8.81.3.4 size\_t uva::smt::bpbd::server::tm::tm\_parameters::m\_num\_lambdas

Definition at line 58 of file tm\_parameters.hpp.

### 8.81.3.5 size\_t uva::smt::bpbd::server::tm::tm\_parameters::m\_num\_unk\_features

Definition at line 64 of file tm\_parameters.hpp.

### 8.81.3.6 size\_t uva::smt::bpbd::server::tm::tm\_parameters::m\_trans\_limit

Definition at line 71 of file tm\_parameters.hpp.

### 8.81.3.7 float uva::smt::bpbd::server::tm::tm\_parameters::m\_unk\_features[NUM\_TM\_FEATURES]

Definition at line 67 of file tm\_parameters.hpp.

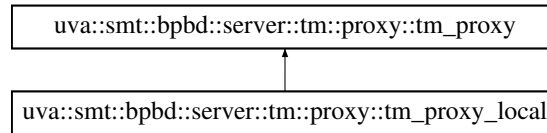
The documentation for this struct was generated from the following file:

- [inc/server/tm/tm\\_parameters.hpp](#)

## 8.82 uva::smt::bpbd::server::tm::proxy::tm\_proxy Class Reference

```
#include <tm_proxy.hpp>
```

Inheritance diagram for uva::smt::bpbd::server::tm::proxy::tm\_proxy:



## Public Member Functions

- virtual void [connect](#) (const [tm\\_parameters](#) &params)=0
- virtual void [disconnect](#) ()=0
- virtual [~tm\\_proxy](#) ()
- virtual [tm\\_query\\_proxy](#) & [allocate\\_query\\_proxy](#) ()=0
- virtual void [dispose\\_query\\_proxy](#) ([tm\\_query\\_proxy](#) &query)=0

### 8.82.1 Detailed Description

This is the translation model proxy interface class it allows to interact with any sort of local and remote models in a uniform way.

Definition at line 42 of file [tm\\_proxy.hpp](#).

### 8.82.2 Constructor & Destructor Documentation

8.82.2.1 virtual [uva::smt::bpbd::server::tm::proxy::tm\\_proxy::~~tm\\_proxy](#) ( ) [inline],[virtual]

The basic virtual destructor

Definition at line 59 of file [tm\\_proxy.hpp](#).

### 8.82.3 Member Function Documentation

8.82.3.1 virtual [tm\\_query\\_proxy](#)& [uva::smt::bpbd::server::tm::proxy::tm\\_proxy::allocate\\_query\\_proxy](#) ( ) [pure virtual]

This method allows to get a query executor for the given trie

Returns

the trie query proxy object

Implemented in [uva::smt::bpbd::server::tm::proxy::tm\\_proxy\\_local](#).

8.82.3.2 virtual void [uva::smt::bpbd::server::tm::proxy::tm\\_proxy::connect](#) ( const [tm\\_parameters](#) & *params* ) [pure virtual]

Allows to connect to the model object based on the given parameters

Parameters

|               |                      |
|---------------|----------------------|
| <i>params</i> | the model parameters |
|---------------|----------------------|

Implemented in [uva::smt::bpbd::server::tm::proxy::tm\\_proxy\\_local](#).

**8.82.3.3** `virtual void uva::smt::bpbd::server::tm::proxy::tm_proxy::disconnect ( ) [pure virtual]`

Allows to disconnect from the trie

Implemented in [uva::smt::bpbd::server::tm::proxy::tm\\_proxy\\_local](#).

**8.82.3.4** `virtual void uva::smt::bpbd::server::tm::proxy::tm_proxy::dispose_query_proxy ( tm_query_proxy & query ) [pure virtual]`

Dispose the previously allocated query object

Parameters

|              |                      |
|--------------|----------------------|
| <i>query</i> | the query to dispose |
|--------------|----------------------|

Implemented in [uva::smt::bpbd::server::tm::proxy::tm\\_proxy\\_local](#).

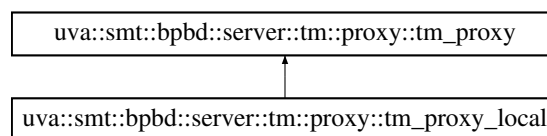
The documentation for this class was generated from the following file:

- [inc/server/tm/proxy/tm\\_proxy.hpp](#)

## 8.83 uva::smt::bpbd::server::tm::proxy::tm\_proxy\_local Class Reference

```
#include <tm_proxy_local.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::tm::proxy::tm_proxy_local`:



### Public Member Functions

- [tm\\_proxy\\_local](#) ()
- virtual [~tm\\_proxy\\_local](#) ()
- virtual void [connect](#) (const [tm\\_parameters](#) &params)
- virtual void [disconnect](#) ()
- virtual [tm\\_query\\_proxy](#) & [allocate\\_query\\_proxy](#) ()
- virtual void [dispose\\_query\\_proxy](#) ([tm\\_query\\_proxy](#) &query)

### Protected Member Functions

- `template<typename tm_builder_type , typename file_reader_type >`  
void [load\\_model\\_data](#) (char const \*model\_name, const [tm\\_parameters](#) &params)

### 8.83.1 Detailed Description

This is the translation model proxy interface class it allows to interact with any sort of local and remote models in a uniform way.

Definition at line 60 of file `tm_proxy_local.hpp`.

## 8.83.2 Constructor & Destructor Documentation

### 8.83.2.1 uva::smt::bpbd::server::tm::proxy::tm\_proxy\_local ( ) [inline]

The basic proxy constructor, currently does nothing except for default initialization

Definition at line 66 of file tm\_proxy\_local.hpp.

### 8.83.2.2 virtual uva::smt::bpbd::server::tm::proxy::tm\_proxy\_local::~~tm\_proxy\_local ( ) [inline], [virtual]

The basic destructor

Definition at line 73 of file tm\_proxy\_local.hpp.

## 8.83.3 Member Function Documentation

### 8.83.3.1 virtual tm\_query\_proxy& uva::smt::bpbd::server::tm::proxy::tm\_proxy\_local::allocate\_query\_proxy ( ) [inline], [virtual]

See also

[tm\\_proxy](#)

Implements [uva::smt::bpbd::server::tm::proxy::tm\\_proxy](#).

Definition at line 97 of file tm\_proxy\_local.hpp.

### 8.83.3.2 virtual void uva::smt::bpbd::server::tm::proxy::tm\_proxy\_local::connect ( const tm\_parameters & params ) [inline], [virtual]

See also

[tm\\_proxy](#)

Implements [uva::smt::bpbd::server::tm::proxy::tm\\_proxy](#).

Definition at line 81 of file tm\_proxy\_local.hpp.

### 8.83.3.3 virtual void uva::smt::bpbd::server::tm::proxy::tm\_proxy\_local::disconnect ( ) [inline], [virtual]

See also

[tm\\_proxy](#)

Implements [uva::smt::bpbd::server::tm::proxy::tm\\_proxy](#).

Definition at line 90 of file tm\_proxy\_local.hpp.

### 8.83.3.4 virtual void uva::smt::bpbd::server::tm::proxy::tm\_proxy\_local::dispose\_query\_proxy ( tm\_query\_proxy & query ) [inline], [virtual]

**Todo** In the future we should just use a number of stack allocated objects in order to reduce the new/delete overhead

See also

[tm\\_proxy](#)

Implements [uva::smt::bpbd::server::tm::proxy::tm\\_proxy](#).

Definition at line 106 of file tm\_proxy\_local.hpp.

```
8.83.3.5 template<typename tm_builder_type , typename file_reader_type > void uva::smt::bpbd::server::tm::proxy::tm_proxy_local::load_model_data (char const * model_name, const tm_parameters & params) [inline], [protected]
```

Allows to load the model into the instance of the selected container class

**Todo** Add the possibility to choose between the file readers from the command line!

#### Parameters

|            |                                                            |
|------------|------------------------------------------------------------|
| <i>the</i> | name of the model being loaded params the model parameters |
|------------|------------------------------------------------------------|

Definition at line 119 of file tm\_proxy\_local.hpp.

The documentation for this class was generated from the following file:

- inc/server/tm/proxy/tm\_proxy\_local.hpp

## 8.84 uva::smt::bpbd::server::tm::models::tm\_query< model\_type > Class Template Reference

```
#include <tm_query.hpp>
```

### Public Types

- typedef unordered\_map< phrase\_uid, tm\_const\_source\_entry\_ptr > query\_map

### Public Member Functions

- tm\_query (const model\_type &model)
- ~tm\_query ()
- void execute (const phrase\_uid uid, tm\_const\_source\_entry\_ptr &entry\_ptr)
- tm\_const\_source\_entry \* get\_source\_entry (const phrase\_uid uid)
- void get\_st\_uids (vector< phrase\_uid > &st\_uids) const

#### 8.84.1 Detailed Description

```
template<typename model_type>class uva::smt::bpbd::server::tm::models::tm_query< model_type >
```

This class represents a query for the translation model In essence it is a map from the source phrases to the pointers to maps storing the translations in the target language. The query object is not re-usable at the moment as during the translation all source translations are retrieved once at the beginning of decoding. This query is based on hashing, i.e. internally the source phrase is stored as a hash value. This might occasionally cause collisions, but since this is a local issue it can be changed in the future.

Definition at line 64 of file tm\_query.hpp.

#### 8.84.2 Member Typedef Documentation

```
8.84.2.1 template<typename model_type> typedef unordered_map<phrase_uid, tm_const_source_entry_ptr> uva::smt::bpbd::server::tm::models::tm_query< model_type >::query_map
```

Definition at line 68 of file tm\_query.hpp.

### 8.84.3 Constructor & Destructor Documentation

8.84.3.1 `template<typename model_type> uva::smt::bpbd::server::tm::models::tm_query< model_type >::tm_query ( const model_type & model ) [inline]`

The basic constructor

Definition at line 73 of file tm\_query.hpp.

8.84.3.2 `template<typename model_type> uva::smt::bpbd::server::tm::models::tm_query< model_type >::~~tm_query ( ) [inline]`

The basic destructor

Definition at line 79 of file tm\_query.hpp.

### 8.84.4 Member Function Documentation

8.84.4.1 `template<typename model_type> void uva::smt::bpbd::server::tm::models::tm_query< model_type >::execute ( const phrase_uid uid, tm_const_source_entry_ptr & entry_ptr ) [inline]`

Allows to execute the translation query for the given source phrase. This query also keeps the local cache of retrieved source phrase translations.

Parameters

|                  |                                                                                                        |
|------------------|--------------------------------------------------------------------------------------------------------|
| <i>uid</i>       | [in] the source phrase uid                                                                             |
| <i>entry_ptr</i> | [out] the reference to the source entry pointer which will be initialized with the found source entry. |

Definition at line 90 of file tm\_query.hpp.

8.84.4.2 `template<typename model_type> tm_const_source_entry* uva::smt::bpbd::server::tm::models::tm_query< model_type >::get_source_entry ( const phrase_uid uid ) [inline]`

Allows to get translations for the given source entry

Parameters

|            |                                            |
|------------|--------------------------------------------|
| <i>uid</i> | the unique identifier of the source phrase |
|------------|--------------------------------------------|

Returns

the pointer to the source entry or NULL if the translation is not found

Definition at line 122 of file tm\_query.hpp.

8.84.4.3 `template<typename model_type> void uva::smt::bpbd::server::tm::models::tm_query< model_type >::get_st_uids ( vector< phrase_uid > & st_uids ) const [inline]`

Allows to get all the source/target phrase identifiers for the source target translation in this query. Must be called after the query is executed

## Parameters

|                      |                                                        |
|----------------------|--------------------------------------------------------|
| <code>st_uids</code> | the container for the source/target phrase identifiers |
|----------------------|--------------------------------------------------------|

Definition at line 134 of file `tm_query.hpp`.

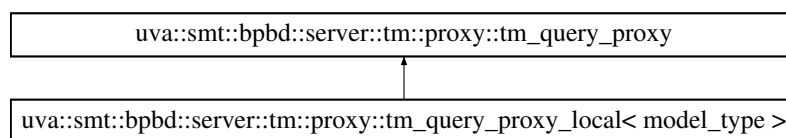
The documentation for this class was generated from the following file:

- `inc/server/tm/models/tm_query.hpp`

## 8.85 uva::smt::bpbd::server::tm::proxy::tm\_query\_proxy Class Reference

```
#include <tm_query_proxy.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::tm::proxy::tm_query_proxy`:



### Public Member Functions

- virtual void `execute` (const `phrase_uid` uid, `tm_const_source_entry_ptr` &entry\_ptr)=0
- virtual `tm_const_source_entry` \* `get_source_entry` (const `phrase_uid` uid)=0
- virtual void `get_st_uids` (vector< `phrase_uid` > &st\_uids) const =0
- virtual `~tm_query_proxy` ()

#### 8.85.1 Detailed Description

This class represents a translation query proxy interface class. It allows to interact with translation model queries in a uniform way.

Definition at line 46 of file `tm_query_proxy.hpp`.

#### 8.85.2 Constructor & Destructor Documentation

8.85.2.1 virtual `uva::smt::bpbd::server::tm::proxy::tm_query_proxy::~tm_query_proxy` ( ) `[inline]`, `[virtual]`

The basic virtual destructor

Definition at line 73 of file `tm_query_proxy.hpp`.

#### 8.85.3 Member Function Documentation

8.85.3.1 virtual void `uva::smt::bpbd::server::tm::proxy::tm_query_proxy::execute` ( const `phrase_uid` uid, `tm_const_source_entry_ptr` &entry\_ptr ) `[pure virtual]`

Allows to add the source phrase to the query.



## Parameters

|                  |                                                                   |
|------------------|-------------------------------------------------------------------|
| <i>uid</i>       | the source phrase uid                                             |
| <i>entry_ptr</i> | the reference to the source entry pointer to be set with the data |

Implemented in [uva::smt::bpbd::server::tm::proxy::tm\\_query\\_proxy\\_local< model\\_type >](#).

**8.85.3.2** `virtual tm_const_source_entry* uva::smt::bpbd::server::tm::proxy::tm_query_proxy::get_source_entry ( const phrase_uid uid )` [pure virtual]

Allows retrieve the translations of the given source entry

## Parameters

|            |                                            |
|------------|--------------------------------------------|
| <i>uid</i> | the unique identifier of the source phrase |
|------------|--------------------------------------------|

## Returns

the pointer to the source entry or NULL if the translation is not found

Implemented in [uva::smt::bpbd::server::tm::proxy::tm\\_query\\_proxy\\_local< model\\_type >](#).

**8.85.3.3** `virtual void uva::smt::bpbd::server::tm::proxy::tm_query_proxy::get_st_uids ( vector< phrase_uid > & st_uids ) const` [pure virtual]

Allows to get all the source/target phrase identifiers for the source target translation in this query. Must be called after the query is executed

## Parameters

|                |                                                        |
|----------------|--------------------------------------------------------|
| <i>st_uids</i> | the container for the source/target phrase identifiers |
|----------------|--------------------------------------------------------|

Implemented in [uva::smt::bpbd::server::tm::proxy::tm\\_query\\_proxy\\_local< model\\_type >](#).

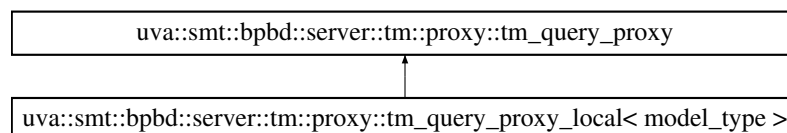
The documentation for this class was generated from the following file:

- [inc/server/tm/proxy/tm\\_query\\_proxy.hpp](#)

## 8.86 uva::smt::bpbd::server::tm::proxy::tm\_query\_proxy\_local< model\_type > Class Template Reference

```
#include <tm_query_proxy_local.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::tm::proxy::tm_query_proxy_local< model_type >`:



### Public Member Functions

- [tm\\_query\\_proxy\\_local](#) (const model\_type &model)
- virtual void [execute](#) (const [phrase\\_uid](#) uid, [tm\\_const\\_source\\_entry\\_ptr](#) &entry\_ptr)
- virtual [tm\\_const\\_source\\_entry](#) \* [get\\_source\\_entry](#) (const [phrase\\_uid](#) uid)
- virtual void [get\\_st\\_uids](#) (vector< [phrase\\_uid](#) > &st\_uids) const
- virtual [~tm\\_query\\_proxy\\_local](#) ()

### 8.86.1 Detailed Description

```
template<typename model_type>class uva::smt::bpbd::server::tm::proxy::tm_query_proxy_local< model_type >
```

This is a local implementation of the translation model query This implementation works with the local translation model

Definition at line 47 of file tm\_query\_proxy\_local.hpp.

### 8.86.2 Constructor & Destructor Documentation

```
8.86.2.1 template<typename model_type > uva::smt::bpbd::server::tm::proxy::tm_query_proxy_local<
model_type >::tm_query_proxy_local (const model_type & model) [inline]
```

The basic constructor that accepts the translation model reference to query to

Parameters

|              |                                |
|--------------|--------------------------------|
| <i>model</i> | the translation model to query |
|--------------|--------------------------------|

Definition at line 54 of file tm\_query\_proxy\_local.hpp.

```
8.86.2.2 template<typename model_type > virtual uva::smt::bpbd::server::tm::proxy::tm_query_proxy_local<
model_type >::~tm_query_proxy_local () [inline],[virtual]
```

See also

[tm\\_query\\_proxy](#)

Definition at line 81 of file tm\_query\_proxy\_local.hpp.

### 8.86.3 Member Function Documentation

```
8.86.3.1 template<typename model_type > virtual void uva::smt::bpbd::server::tm::proxy::tm_query_proxy↵
_local< model_type >::execute (const phrase_uid uid, tm_const_source_entry_ptr & entry_ptr)
[inline],[virtual]
```

See also

[tm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::tm::proxy::tm\\_query\\_proxy](#).

Definition at line 60 of file tm\_query\_proxy\_local.hpp.

```
8.86.3.2 template<typename model_type > virtual tm_const_source_entry* uva::smt::bpbd::server::tm::proxy↵
::tm_query_proxy_local< model_type >::get_source_entry (const phrase_uid uid) [inline],
[virtual]
```

See also

[tm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::tm::proxy::tm\\_query\\_proxy](#).

Definition at line 67 of file tm\_query\_proxy\_local.hpp.

8.86.3.3 `template<typename model_type > virtual void uva::smt::bpbd::server::tm::proxy::tm_query_proxy_local< model_type >::get_st_uids ( vector< phrase_uid > & st_uids ) const [inline], [virtual]`

See also

[tm\\_query\\_proxy](#)

Implements [uva::smt::bpbd::server::tm::proxy::tm\\_query\\_proxy](#).

Definition at line 74 of file `tm_query_proxy_local.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/tm/proxy/tm_query_proxy_local.hpp`

## 8.87 `uva::smt::bpbd::server::tm::models::tm_source_entry` Class Reference

```
#include <tm_source_entry.hpp>
```

### Public Member Functions

- [tm\\_source\\_entry](#) ()
- [~tm\\_source\\_entry](#) ()
- `bool has_translations () const`
- `phrase_uid get_source_uid ()`
- `void set_source_uid (phrase_uid s_uid)`
- `void begin (const size_t capacity)`
- `void finalize ()`
- `void add_target (const string &target, const phrase_uid target_uid, const size_t num_features, const prob_weight *features, const phrase_length num_words, const word_uid *word_ids, const prob_weight lm_weight)`
- `prob_weight get_min_cost () const`
- `bool has_target (const phrase_uid target_uid) const`
- `void get_st_uids (vector< phrase_uid > &st_uids) const`
- `bool operator== (const phrase_uid &phrase_uid) const`
- `bool operator== (const tm_source_entry &other) const`
- `size_t num_targets () const`
- `tm_const_target_entry * get_targets () const`

### 8.87.1 Detailed Description

This is the source entry data structure that contains two things The source phrase uid, which is the unique identifier of the source string and the map storing the target translations. Note that the source phrase is not stored, this is to reduce memory consumption and improve speed. Similar as we did for the g2dm tried implementation for the language model.

Definition at line 65 of file `tm_source_entry.hpp`.

### 8.87.2 Constructor & Destructor Documentation

8.87.2.1 `uva::smt::bpbd::server::tm::models::tm_source_entry::tm_source_entry ( ) [inline]`

The basic constructor

Definition at line 71 of file `tm_source_entry.hpp`.

**8.87.2.2** `uva::smt::bpbd::server::tm::models::tm_source_entry::~~tm_source_entry ( )` `[inline]`

The basic destructor

Definition at line 78 of file `tm_source_entry.hpp`.

### 8.87.3 Member Function Documentation

**8.87.3.1** `void uva::smt::bpbd::server::tm::models::tm_source_entry::add_target ( const string &target, const phrase_uid target_uid, const size_t num_features, const prob_weight * features, const phrase_length num_words, const word_uid * word_ids, const prob_weight lm_weight )` `[inline]`

Allows to add a new translation to the source entry for the given target phrase

Parameters

|                     |                                                      |
|---------------------|------------------------------------------------------|
| <i>target</i>       | the target phrase string                             |
| <i>target_uid</i>   | the uid of the target phrase                         |
| <i>num_features</i> | the number of features in the next array             |
| <i>weights</i>      | the features to put into the entry                   |
| <i>num_words</i>    | the number of words in the target translation        |
| <i>word_ids</i>     | the LM word ids for the target phrase                |
| <i>lm_weight</i>    | the cost of the target translation from the LM model |

Definition at line 147 of file `tm_source_entry.hpp`.

**8.87.3.2** `void uva::smt::bpbd::server::tm::models::tm_source_entry::begin ( const size_t capacity )` `[inline]`

Should be called to start the source entry, i.e. initialize the memory

Parameters

|                 |                                           |
|-----------------|-------------------------------------------|
| <i>capacity</i> | the number of translations for this entry |
|-----------------|-------------------------------------------|

Definition at line 119 of file `tm_source_entry.hpp`.

**8.87.3.3** `void uva::smt::bpbd::server::tm::models::tm_source_entry::finalize ( )` `[inline]`

Should be called to indicate that this source entry is finished, i.e. all the translations have been set.

Definition at line 129 of file `tm_source_entry.hpp`.

**8.87.3.4** `prob_weight uva::smt::bpbd::server::tm::models::tm_source_entry::get_min_cost ( ) const` `[inline]`

Allows to get the minimum translation cost for the given source phrase, i.e what we have is:  $\log_{10}(\text{maximum}_{t \in T} (P_{tm}(t|s) * P_{lm}(t)))$

Returns

the minimum translation cost for the given source phrase

Definition at line 172 of file `tm_source_entry.hpp`.

**8.87.3.5** `phrase_uid uva::smt::bpbd::server::tm::models::tm_source_entry::get_source_uid ( )` `[inline]`

Allows to get the source phrase id

**Returns**

the source phrase id

Definition at line 103 of file tm\_source\_entry.hpp.

**8.87.3.6** `void uva::smt::bpbd::server::tm::models::tm_source_entry::get_st_uids ( vector< phrase_uid > & st_uids ) const [inline]`

Allows to get all the source/target phrase identifiers for the source target translation in this query.

**Parameters**

|                |                                                        |
|----------------|--------------------------------------------------------|
| <i>st_uids</i> | the container for the source/target phrase identifiers |
|----------------|--------------------------------------------------------|

Definition at line 216 of file tm\_source\_entry.hpp.

**8.87.3.7** `tm_const_target_entry* uva::smt::bpbd::server::tm::models::tm_source_entry::get_targets ( ) const [inline]`

Allows to get an array of of target entries, if any

**Returns**

the pointer to the first target entry, or NULL if none

Definition at line 252 of file tm\_source\_entry.hpp.

**8.87.3.8** `bool uva::smt::bpbd::server::tm::models::tm_source_entry::has_target ( const phrase_uid target_uid ) const [inline]`

Allows to check if the translation of the given target is present. NOTE: This check is not optimal a better data structure for storing entries might be needed, although this method is only used when building the Reordering model.

**Parameters**

|                   |                                    |
|-------------------|------------------------------------|
| <i>target_uid</i> | the unique identifier of the taret |
|-------------------|------------------------------------|

**Returns**

true if the target is known, otherwise false

Definition at line 184 of file tm\_source\_entry.hpp.

**8.87.3.9** `bool uva::smt::bpbd::server::tm::models::tm_source_entry::has_translations ( ) const [inline]`

Allows to detect whether the given source entry is for the UNK phrase or not. The UNK phrase is the phrase with an unknown translation

**Returns**

false if the source entry is for the UNK phrase, otherwise false

Definition at line 90 of file tm\_source\_entry.hpp.

**8.87.3.10** `size_t uva::smt::bpbd::server::tm::models::tm_source_entry::num_targets ( ) const [inline]`

Allows to get the number of target entries

#### Returns

the number of target entries, or 0 if none

Definition at line 244 of file `tm_source_entry.hpp`.

**8.87.3.11** `bool uva::smt::bpbd::server::tm::models::tm_source_entry::operator== ( const phrase_uid & phrase_uid ) const [inline]`

The comparison operator, allows to compare source entries

#### Parameters

|                   |                                                           |
|-------------------|-----------------------------------------------------------|
| <i>phrase_uid</i> | the unique identifier of the source entry to compare with |
|-------------------|-----------------------------------------------------------|

#### Returns

true if the provided uid is equal to the uid of this entry, otherwise false

Definition at line 227 of file `tm_source_entry.hpp`.

**8.87.3.12** `bool uva::smt::bpbd::server::tm::models::tm_source_entry::operator== ( const tm_source_entry & other ) const [inline]`

The comparison operator, allows to compare source entries

#### Parameters

|              |                                      |
|--------------|--------------------------------------|
| <i>other</i> | the the source entry to compare with |
|--------------|--------------------------------------|

#### Returns

true if the uid of the provided entry is equal to the uid of this entry, otherwise false

Definition at line 236 of file `tm_source_entry.hpp`.

**8.87.3.13** `void uva::smt::bpbd::server::tm::models::tm_source_entry::set_source_uid ( phrase_uid s_uid ) [inline]`

Allows to set the source phrase id

#### Parameters

|              |                      |
|--------------|----------------------|
| <i>s_uid</i> | the source phrase id |
|--------------|----------------------|

Definition at line 111 of file `tm_source_entry.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/tm/models/tm_source_entry.hpp`

**8.88** `uva::smt::bpbd::server::tm::models::tm_target_entry_temp< max_num_features`  
**> Class Template Reference**

```
#include <tm_target_entry.hpp>
```

## Public Member Functions

- [tm\\_target\\_entry\\_temp](#) ()
- [~tm\\_target\\_entry\\_temp](#) ()
- void [set\\_data](#) (const [phrase\\_uid](#) source\_uid, const string &target\_phrase, const [phrase\\_uid](#) target\_uid, const size\_t num\_features, const float \*features, const [phrase\\_length](#) num\_words, const [word\\_uid](#) \*word\_ids)
- bool [is\\_unk\\_trans](#) () const
- const string & [get\\_target\\_phrase](#) () const
- const [phrase\\_uid](#) [get\\_st\\_uid](#) () const
- const [prob\\_weight](#) [get\\_total\\_weight](#) () const
- const [prob\\_weight](#) [get\\_t\\_c\\_s](#) () const
- [phrase\\_length](#) [get\\_num\\_words](#) () const
- const [word\\_uid](#) \* [get\\_word\\_ids](#) () const

## Static Public Attributes

- static constexpr uint8\_t [NUM\\_FEATURES](#) = max\_num\_features
- static const [phrase\\_uid](#) [UNKNOWN\\_TARGET\\_ENTRY\\_UID](#) = combine\_phrase\_uids(UNKNOWN\_PHRASE\_ID, UNKNOWN\_PHRASE\_ID)

## Protected Member Functions

- void [set\\_features](#) (const size\_t num\_features, const [prob\\_weight](#) \*features)

### 8.88.1 Detailed Description

```
template<uint8_t max_num_features>class uva::smt::bpbd::server::tm::models::tm_target_entry_temp< max_num_features >
```

This structure represents the translation data, i.e. the the target phrase plus the probability weights. See <http://www.statmt.org/moses/?n=FactoredTraining.ScorePhrases> for more details on the weights. Note that for this entry we have a uid that is a unique identifier of the target phrase string. The latter can be a hash value but then there is a possibility for the hash collisions

Definition at line 66 of file `tm_target_entry.hpp`.

### 8.88.2 Constructor & Destructor Documentation

8.88.2.1 `template<uint8_t max_num_features> uva::smt::bpbd::server::tm::models::tm_target_entry_temp< max_num_features >::tm_target_entry_temp ( ) [inline]`

The basic constructor

Definition at line 77 of file `tm_target_entry.hpp`.

8.88.2.2 `template<uint8_t max_num_features> uva::smt::bpbd::server::tm::models::tm_target_entry_temp< max_num_features >::~~tm_target_entry_temp ( ) [inline]`

The basic destructor

Definition at line 85 of file `tm_target_entry.hpp`.

### 8.88.3 Member Function Documentation

**8.88.3.1** `template<uint8_t max_num_features> phrase_length uva::smt::bpbd::server::tm↔  
::models::tm_target_entry_temp< max_num_features >::get_num_words ( ) const  
[inline]`

Allows to get the number of words in the target translation

#### Returns

the number of words

Definition at line 172 of file tm\_target\_entry.hpp.

**8.88.3.2** `template<uint8_t max_num_features> const phrase_uid uva::smt::bpbd::server↔  
::tm::models::tm_target_entry_temp< max_num_features >::get_st_uid ( ) const  
[inline]`

Allows to retrieve the source/target phrase pair uid

#### Returns

the source/target phrase pair uid

Definition at line 146 of file tm\_target\_entry.hpp.

**8.88.3.3** `template<uint8_t max_num_features> const prob_weight uva::smt::bpbd::server↔  
::tm::models::tm_target_entry_temp< max_num_features >::get_t_c_s ( ) const  
[inline]`

Allows to get the value of the third feature which is the  $\log_{10}(p(e|f))$

#### Returns

the value of the third feature which is the  $\log_{10}(p(e|f))$

Definition at line 163 of file tm\_target\_entry.hpp.

**8.88.3.4** `template<uint8_t max_num_features> const string& uva::smt::bpbd::server::tm↔  
::models::tm_target_entry_temp< max_num_features >::get_target_phrase ( ) const  
[inline]`

Allows to get the target phrase

#### Returns

the reference to the const target phrase

Definition at line 138 of file tm\_target\_entry.hpp.

**8.88.3.5** `template<uint8_t max_num_features> const prob_weight uva::smt::bpbd::server::tm↔  
::models::tm_target_entry_temp< max_num_features >::get_total_weight ( ) const  
[inline]`

Allows to get the total weight of the entry, the sum of features that are turned into log10 scale.



## Returns

the total weight of the entry, the sum of feature weights

Definition at line 155 of file tm\_target\_entry.hpp.

```
8.88.3.6 template<uint8_t max_num_features> const word_uid* uva::smt::bpbd::server::tm::models::tm_target_entry_temp<
max_num_features >::get_word_ids () const
[inline]
```

This method allows to get the

## Returns

an array of word ids of the target phrase, the length must be equal to LM\_QUERY\_LENGTH\_MAX

Definition at line 180 of file tm\_target\_entry.hpp.

```
8.88.3.7 template<uint8_t max_num_features> bool uva::smt::bpbd::server::tm::models::tm_target_entry_temp<
max_num_features >::is_unk_trans () const [inline]
```

Allows to check whether this is an unknown translation

## Returns

true if this is UNK translation, otherwise false

Definition at line 130 of file tm\_target\_entry.hpp.

```
8.88.3.8 template<uint8_t max_num_features> void uva::smt::bpbd::server::tm::models::tm_target_entry_temp<
max_num_features >::set_data (const phrase_uid source_uid, const string & target_phrase, const phrase_uid
target_uid, const size_t num_features, const float * features, const phrase_length num_words, const word_uid
* word_ids) [inline]
```

Allows to set the target phrase and its id

## Parameters

|                      |                                                                                                |
|----------------------|------------------------------------------------------------------------------------------------|
| <i>source_uid</i>    | store the source uid for being combined with the target phrase into the source/target pair uid |
| <i>target_phrase</i> | the target phrase                                                                              |
| <i>target_uid</i>    | the uid of the target phrase                                                                   |
| <i>num_features</i>  | the number of features to be set, already in the log10 scale                                   |
| <i>features</i>      | the weights to be set into the entry                                                           |
| <i>num_words</i>     | the number of words in the target translation                                                  |
| <i>word_ids</i>      | the LM word ids for the target phrase                                                          |

Definition at line 104 of file tm\_target\_entry.hpp.

```
8.88.3.9 template<uint8_t max_num_features> void uva::smt::bpbd::server::tm::models::tm_target_entry_temp<
max_num_features >::set_features (const size_t num_features, const prob_weight * features) [inline],
[protected]
```

Allows to set the weights into the target entry.

**Todo** Get rid of magic constants here!

## Parameters

|                     |                                                                                                                                                                                                                                                    |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>num_features</i> | the number of features to be set, already in the log10 scale                                                                                                                                                                                       |
| <i>features</i>     | the weights to be set into the entry This is an array of translation weights, as we have here↵<br>: features[0] = p(f e); features[1] = lex(p(f e)); features[2] = p(e f); features[3] = lex(p(e f));<br>features[4] = phrase penalty; // optional |

Definition at line 198 of file tm\_target\_entry.hpp.

## 8.88.4 Member Data Documentation

8.88.4.1 `template<uint8_t max_num_features> constexpr uint8_t uva::smt::bpbd::server::tm↵  
::models::tm_target_entry_temp< num_features >::NUM_FEATURES = max_num_features  
[static]`

Definition at line 69 of file tm\_target\_entry.hpp.

8.88.4.2 `template<uint8_t max_num_features> const phrase_uid uva::smt::bpbd::server::tm↵  
::models::tm_target_entry_temp< num_features >::UNKNOWN_TARGET_ENTRY_UID =  
combine_phrase_uids(UNKNOWN_PHRASE_ID, UNKNOWN_PHRASE_ID) [static]`

Definition at line 72 of file tm\_target\_entry.hpp.

The documentation for this class was generated from the following files:

- inc/server/tm/models/[tm\\_target\\_entry.hpp](#)
- src/server/tm/models/[tm\\_target\\_entry.cpp](#)

## 8.89 uva::smt::bpbd::client::trans\_job Struct Reference

```
#include <trans_job.hpp>
```

### Public Member Functions

- [trans\\_job](#) ()
- virtual [~trans\\_job](#) ()

### Public Attributes

- uint32\_t [m\\_num\\_sentences](#)
- [trans\\_job\\_request\\_ptr](#) [m\\_request](#)
- [trans\\_job\\_response\\_ptr](#) [m\\_response](#)
- [trans\\_job\\_status](#) [m\\_status](#)

### 8.89.1 Detailed Description

This structure is used for storing the translation job data

Definition at line 51 of file trans\_job.hpp.

## 8.89.2 Constructor & Destructor Documentation

### 8.89.2.1 uva::smt::bpbd::client::trans\_job::trans\_job ( ) [inline]

The basic constructor that does default-initialization of the structure fields

Definition at line 56 of file trans\_job.hpp.

### 8.89.2.2 virtual uva::smt::bpbd::client::trans\_job::~~trans\_job ( ) [inline], [virtual]

The basic destructor that allows to delete the dynamically allocated data pointed by the structure fields

Definition at line 65 of file trans\_job.hpp.

## 8.89.3 Member Data Documentation

### 8.89.3.1 uint32\_t uva::smt::bpbd::client::trans\_job::m\_num\_sentences

Definition at line 75 of file trans\_job.hpp.

### 8.89.3.2 trans\_job\_request\_ptr uva::smt::bpbd::client::trans\_job::m\_request

Definition at line 77 of file trans\_job.hpp.

### 8.89.3.3 trans\_job\_response\_ptr uva::smt::bpbd::client::trans\_job::m\_response

Definition at line 79 of file trans\_job.hpp.

### 8.89.3.4 trans\_job\_status uva::smt::bpbd::client::trans\_job::m\_status

Definition at line 81 of file trans\_job.hpp.

The documentation for this struct was generated from the following file:

- inc/client/trans\_job.hpp

## 8.90 uva::smt::bpbd::server::trans\_job Class Reference

```
#include <trans_job.hpp>
```

### Public Types

- typedef function< void(trans\_job\_ptr trans\_job) > done\_job\_notifier
- typedef vector< trans\_task\_ptr > tasks\_list\_type
- typedef tasks\_list\_type::iterator tasks\_iter\_type
- typedef tasks\_list\_type::const\_iterator tasks\_const\_iter\_type

### Public Member Functions

- trans\_job(trans\_job\_request\_ptr request\_ptr)
- void set\_done\_job\_notifier(done\_job\_notifier notify\_job\_done\_func)
- virtual ~trans\_job()

- const [session\\_id\\_type](#) [get\\_session\\_id](#) () const
- const [job\\_id\\_type](#) [get\\_job\\_id](#) () const
- const [tasks\\_list\\_type](#) & [get\\_tasks](#) ()
- virtual const [trans\\_job\\_code](#) [get\\_code](#) () const
- virtual const string & [get\\_text](#) () const
- void [cancel](#) ()

## Protected Member Functions

- bool [is\\_job\\_finished](#) ()
- void [notify\\_task\\_done](#) (const [trans\\_task\\_ptr](#) &task)
- void [combine\\_job\\_result](#) ()

## 8.90.1 Detailed Description

This class represents the translation job. Each translation job belongs to a session and contains a translation request. Every translation request is a text consisting of multiple sentences. The translation job therefore splits this request into a number of translation tasks each of which translates one sentence.

Definition at line 61 of file [trans\\_job.hpp](#).

## 8.90.2 Member Typedef Documentation

8.90.2.1 `typedef function<void(trans_job_ptr trans_job)> uva::smt::bpbd::server::trans_job::done_job_↵  
notifier`

Definition at line 65 of file [trans\\_job.hpp](#).

8.90.2.2 `typedef tasks_list_type::const_iterator uva::smt::bpbd::server::trans_job::tasks_const_iter_type`

Definition at line 70 of file [trans\\_job.hpp](#).

8.90.2.3 `typedef tasks_list_type::iterator uva::smt::bpbd::server::trans_job::tasks_iter_type`

Definition at line 69 of file [trans\\_job.hpp](#).

8.90.2.4 `typedef vector<trans_task_ptr> uva::smt::bpbd::server::trans_job::tasks_list_type`

Definition at line 68 of file [trans\\_job.hpp](#).

## 8.90.3 Constructor & Destructor Documentation

8.90.3.1 `uva::smt::bpbd::server::trans_job::trans_job ( trans_job_request_ptr request_ptr ) [inline]`

The basic constructor allowing to initialize the main class constants

Parameters

|                   |                                                                      |
|-------------------|----------------------------------------------------------------------|
| <i>session_id</i> | the id of the session from which the translation request is received |
|-------------------|----------------------------------------------------------------------|

|                 |                                                      |
|-----------------|------------------------------------------------------|
| <i>job_id</i>   | the translation job id                               |
| <i>task_ids</i> | the list of task ids from which this job consists of |

Definition at line 78 of file trans\_job.hpp.

**8.90.3.2** `virtual uva::smt::bpbd::server::trans_job::~trans_job ( ) [inline],[virtual]`

The basic destructor

Definition at line 114 of file trans\_job.hpp.

## 8.90.4 Member Function Documentation

**8.90.4.1** `void uva::smt::bpbd::server::trans_job::cancel ( ) [inline]`

Allows to cancel the given translation job by telling all the translation tasks to stop.

Definition at line 177 of file trans\_job.hpp.

**8.90.4.2** `void uva::smt::bpbd::server::trans_job::combine_job_result ( ) [inline],[protected]`

Allows to compile the end job result, e.g. based on the task results, come up with the job's result code and the translated text.

Definition at line 251 of file trans\_job.hpp.

**8.90.4.3** `virtual const trans_job_code uva::smt::bpbd::server::trans_job::get_code ( ) const [inline],[virtual]`

Allows to retrieve the translation task result code

**Returns**

the translation task result code

Definition at line 162 of file trans\_job.hpp.

**8.90.4.4** `const job_id_type uva::smt::bpbd::server::trans_job::get_job_id ( ) const [inline]`

Allows to retrieve the job id

**Returns**

the job id

Definition at line 146 of file trans\_job.hpp.

**8.90.4.5** `const session_id_type uva::smt::bpbd::server::trans_job::get_session_id ( ) const [inline]`

Allows to retrieve the session id

**Returns**

the session id

Definition at line 138 of file trans\_job.hpp.

**8.90.4.6** `const tasks_list_type& uva::smt::bpbd::server::trans_job::get_tasks ( ) [inline]`

Allows to get the list of translation tasks

#### Returns

the list of translation tasks of this job

Definition at line 154 of file `trans_job.hpp`.

**8.90.4.7** `virtual const string& uva::smt::bpbd::server::trans_job::get_text ( ) const [inline],[virtual]`

Allows to retrieve the translation task result text

#### Returns

the translation task result text

Definition at line 170 of file `trans_job.hpp`.

**8.90.4.8** `bool uva::smt::bpbd::server::trans_job::is_job_finished ( ) [inline],[protected]`

Allows to check if the job is finished by checking the number of finished tasks. The check is synchronized.

#### Returns

true if all the job's tasks are finished, otherwise false

Definition at line 195 of file `trans_job.hpp`.

**8.90.4.9** `void uva::smt::bpbd::server::trans_job::notify_task_done ( const trans_task_ptr & task ) [inline],[protected]`

Is used from the translation task to notify the translation job that the task is ready. This method is thread safe.

**Todo** {Do a strict check on the tasks reporting to be finished, these should be the ones from the `m_tasks` list and they must report themselves only ones. (Optional - for safety).}

#### Parameters

|             |                                       |
|-------------|---------------------------------------|
| <i>task</i> | the translation task that is finished |
|-------------|---------------------------------------|

Definition at line 216 of file `trans_job.hpp`.

**8.90.4.10** `void uva::smt::bpbd::server::trans_job::set_done_job_notifier ( done_job_notifier notify_job_done_func ) [inline]`

Allows to set the function that should be called when the job is done

#### Parameters

|                                   |  |
|-----------------------------------|--|
| <i>notify_job_↔<br/>done_func</i> |  |
|-----------------------------------|--|

Definition at line 107 of file `trans_job.hpp`.

The documentation for this class was generated from the following file:

- [inc/server/trans\\_job.hpp](#)

## 8.91 uva::smt::bpbd::common::messaging::trans\_job\_code Class Reference

```
#include <trans_job_code.hpp>
```

### Public Types

- enum `values` {  
`RESULT_UNDEFINED` = 0, `RESULT_OK` = `RESULT_UNDEFINED` + 1, `RESULT_ERROR` = `RESULT_OK` + 1, `RESULT_CANCELED` = `RESULT_ERROR` + 1,  
`RESULT_PARTIAL` = `RESULT_CANCELED` + 1, `size` = `RESULT_PARTIAL` + 1 }

### Public Member Functions

- `trans_job_code` (const `values` code)
- `trans_job_code` (const int32\_t code\_val)
- `trans_job_code` ()
- void `operator=` (const `values` &code)
- bool `operator==` (const `values` &code) const
- bool `operator<` (const `values` &code) const
- `operator string` () const
- `operator int` () const
- const char \*const `str` () const
- `values val` ()

#### 8.91.1 Detailed Description

This class represents the translation job result code. This class is used on client and server side. It represents the server-side status of a translation job and a translation taks.

Definition at line 49 of file `trans_job_code.hpp`.

#### 8.91.2 Member Enumeration Documentation

##### 8.91.2.1 enum uva::smt::bpbd::common::messaging::trans\_job\_code::values

Stores the translation job result codes, currently there is just two results possible, the job is done - OK; or there was some error - ERROR

Enumerator

```
RESULT_UNDEFINED
RESULT_OK
RESULT_ERROR
RESULT_CANCELED
RESULT_PARTIAL
size
```

Definition at line 57 of file `trans_job_code.hpp`.

#### 8.91.3 Constructor & Destructor Documentation

##### 8.91.3.1 uva::smt::bpbd::common::messaging::trans\_job\_code::trans\_job\_code ( const values code ) [inline]

The basic constructor that allows to initialize the value with the code

**Parameters**

|             |                                   |
|-------------|-----------------------------------|
| <i>code</i> | the code value to initialize with |
|-------------|-----------------------------------|

Definition at line 70 of file trans\_job\_code.hpp.

**8.91.3.2** `uva::smt::bpbd::common::messaging::trans_job_code::trans_job_code ( const int32_t code_val )` `[inline]`

The basic constructor that allows to initialize the value from an integer

**Parameters**

|                 |                                   |
|-----------------|-----------------------------------|
| <i>code_val</i> | the code value to initialize with |
|-----------------|-----------------------------------|

Definition at line 77 of file trans\_job\_code.hpp.

**8.91.3.3** `uva::smt::bpbd::common::messaging::trans_job_code::trans_job_code ( )` `[inline]`

The basic constructor that creates an undefined value

Definition at line 89 of file trans\_job\_code.hpp.

**8.91.4 Member Function Documentation**

**8.91.4.1** `uva::smt::bpbd::common::messaging::trans_job_code::operator int ( ) const` `[inline]`

The operator allowing to convert the value to an integer

**Returns**

the the integer value

Definition at line 128 of file trans\_job\_code.hpp.

**8.91.4.2** `uva::smt::bpbd::common::messaging::trans_job_code::operator string ( ) const` `[inline]`

The operator allowing to convert the value to string

**Returns**

the string representation of the code

Definition at line 120 of file trans\_job\_code.hpp.

**8.91.4.3** `bool uva::smt::bpbd::common::messaging::trans_job_code::operator< ( const values & code ) const`  
`[inline]`

Overloading the comparison operator for the code

**Parameters**

|             |                          |
|-------------|--------------------------|
| <i>code</i> | the code to compare with |
|-------------|--------------------------|

Definition at line 112 of file trans\_job\_code.hpp.

**8.91.4.4** `void uva::smt::bpbd::common::messaging::trans_job_code::operator= ( const values & code )` `[inline]`

Overloading the assignment operator for the code



## Parameters

|             |                 |
|-------------|-----------------|
| <i>code</i> | the code to set |
|-------------|-----------------|

Definition at line 96 of file trans\_job\_code.hpp.

**8.91.4.5** `bool uva::smt::bpbd::common::messaging::trans_job_code::operator==( const values & code ) const`  
`[inline]`

Overloading the equality operator for the code

## Parameters

|             |                                 |
|-------------|---------------------------------|
| <i>code</i> | the code to check equality with |
|-------------|---------------------------------|

Definition at line 104 of file trans\_job\_code.hpp.

**8.91.4.6** `const char *const uva::smt::bpbd::common::messaging::trans_job_code::str ( ) const`

Allows to get the job code string for reporting

## Returns

the job code string

Definition at line 51 of file trans\_job\_code.cpp.

**8.91.4.7** `values uva::smt::bpbd::common::messaging::trans_job_code::val ( )` `[inline]`

Returns the stored code value

## Returns

the stored code value

Definition at line 142 of file trans\_job\_code.hpp.

The documentation for this class was generated from the following files:

- inc/common/messaging/trans\_job\_code.hpp
- src/common/messaging/trans\_job\_code.cpp

## 8.92 uva::smt::bpbd::server::trans\_job\_pool Class Reference

```
#include <trans_job_pool.hpp>
```

### Public Types

- typedef function< void(trans\_job\_ptr trans\_job) > finished\_job\_notifier
- typedef std::map< job\_id\_type, trans\_job\_ptr > jobs\_map\_type
- typedef jobs\_map\_type::iterator jobs\_map\_iter\_type
- typedef std::map< session\_id\_type, jobs\_map\_type > sessions\_map\_type
- typedef sessions\_map\_type::iterator sessions\_map\_iter\_type
- typedef vector< trans\_job\_ptr > jobs\_list\_type
- typedef jobs\_list\_type::iterator jobs\_list\_iter\_type

## Public Member Functions

- [trans\\_job\\_pool](#) (const size\_t num\_threads)
- virtual [~trans\\_job\\_pool](#) ()
- void [stop](#) ()
- void [set\\_num\\_threads](#) (const size\_t num\_threads)
- void [report\\_run\\_time\\_info](#) ()
- void [set\\_job\\_result\\_setter](#) (finished\_job\_notifier notify\_job\_finished\_func)
- void [plan\\_new\\_job](#) (trans\_job\_ptr trans\_job)
- void [cancel\\_jobs](#) (const session\_id\_type session\_id)

## Protected Member Functions

- void [cancel\\_all\\_jobs](#) ()
- void [add\\_job](#) (trans\_job\_ptr trans\_job)
- void [delete\\_job](#) (trans\_job\_ptr trans\_job)
- bool [is\\_stop\\_running](#) ()
- void [wake\\_up\\_jobs\\_thread](#) ()
- void [notify\\_job\\_done](#) (trans\_job\_ptr trans\_job)
- void [process\\_finished\\_jobs](#) ()

### 8.92.1 Detailed Description

This class is used to schedule the translation jobs. Each translation job consists of a number of sentences to translate. Each sentence will be translated in its own thread with its own decoder instance. The job of this class is to split the translation job into a number of translation tasks and schedule them. This class is synchronized and has its own thread to schedule the translation tasks.

Definition at line 66 of file `trans_job_pool.hpp`.

### 8.92.2 Member Typedef Documentation

**8.92.2.1** `typedef function<void(trans_job_ptr trans_job) > uva::smt::bpbd::server::trans_job_pool::finished_↵  
_job_notifier`

Definition at line 70 of file `trans_job_pool.hpp`.

**8.92.2.2** `typedef jobs_list_type::iterator uva::smt::bpbd::server::trans_job_pool::jobs_list_iter_type`

Definition at line 80 of file `trans_job_pool.hpp`.

**8.92.2.3** `typedef vector<trans_job_ptr> uva::smt::bpbd::server::trans_job_pool::jobs_list_type`

Definition at line 79 of file `trans_job_pool.hpp`.

**8.92.2.4** `typedef jobs_map_type::iterator uva::smt::bpbd::server::trans_job_pool::jobs_map_iter_type`

Definition at line 74 of file `trans_job_pool.hpp`.

**8.92.2.5** `typedef std::map<job_id_type, trans_job_ptr> uva::smt::bpbd::server::trans_job_pool::jobs_map_↵  
type`

Definition at line 73 of file `trans_job_pool.hpp`.

8.92.2.6 `typedef sessions_map_type::iterator uva::smt::bpbd::server::trans_job_pool::sessions_map_iter_type`

Definition at line 76 of file `trans_job_pool.hpp`.

8.92.2.7 `typedef std::map<session_id_type, jobs_map_type> uva::smt::bpbd::server::trans_job_pool::sessions_map_type`

Definition at line 75 of file `trans_job_pool.hpp`.

## 8.92.3 Constructor & Destructor Documentation

8.92.3.1 `uva::smt::bpbd::server::trans_job_pool::trans_job_pool ( const size_t num_threads ) [inline]`

The basic constructor, starts the finished jobs processing thread.

Parameters

|                          |                                          |
|--------------------------|------------------------------------------|
| <code>num_threads</code> | the number of translation threads to run |
|--------------------------|------------------------------------------|

Definition at line 86 of file `trans_job_pool.hpp`.

8.92.3.2 `virtual uva::smt::bpbd::server::trans_job_pool::~~trans_job_pool ( ) [inline],[virtual]`

he basic destructor

Definition at line 94 of file `trans_job_pool.hpp`.

## 8.92.4 Member Function Documentation

8.92.4.1 `void uva::smt::bpbd::server::trans_job_pool::add_job ( trans_job_ptr trans_job ) [inline],[protected]`

Allows to add a new job to the administration. In case the session is not known or the job id is already in use an exception is thrown. Also the job count is incremented

**Todo** {Later, the tasks pool shall be chosen based on the source and target language. This is for when a server can translate from multiple languages to multiple languages.}

Parameters

|                        |                                           |
|------------------------|-------------------------------------------|
| <code>trans_job</code> | the job to be added to the administration |
|------------------------|-------------------------------------------|

Definition at line 253 of file `trans_job_pool.hpp`.

8.92.4.2 `void uva::smt::bpbd::server::trans_job_pool::cancel_all_jobs ( ) [inline],[protected]`

Allows to cancel all the currently running translation jobs in the server

Definition at line 230 of file `trans_job_pool.hpp`.

8.92.4.3 `void uva::smt::bpbd::server::trans_job_pool::cancel_jobs ( const session_id_type session_id ) [inline]`

Allows to cancel all translation jobs for the given session id.

## Parameters

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| <a href="#"><i>session_id</i></a> | the session id to cancel the jobs for |
|-----------------------------------|---------------------------------------|

Definition at line 201 of file trans\_job\_pool.hpp.

8.92.4.4 `void uva::smt::bpbd::server::trans_job_pool::delete_job ( trans_job_ptr trans_job ) [inline], [protected]`

Allows to delete the given job from the administration, decrement the jobs count and destroy the job object.

## Parameters

|                                  |                       |
|----------------------------------|-----------------------|
| <a href="#"><i>trans_job</i></a> | the job to be deleted |
|----------------------------------|-----------------------|

Definition at line 288 of file trans\_job\_pool.hpp.

8.92.4.5 `bool uva::smt::bpbd::server::trans_job_pool::is_stop_running ( ) [inline], [protected]`

Allows to check if the finished jobs processing loop has to stop.

## Returns

true if the finished jobs processing loop has to stop, otherwise false

Definition at line 324 of file trans\_job\_pool.hpp.

8.92.4.6 `void uva::smt::bpbd::server::trans_job_pool::notify_job_done ( trans_job_ptr trans_job ) [inline], [protected]`

Allows notify the job pool that the given job is done.

## Parameters

|                                  |                                             |
|----------------------------------|---------------------------------------------|
| <a href="#"><i>trans_job</i></a> | the pointer to the finished translation job |
|----------------------------------|---------------------------------------------|

Definition at line 363 of file trans\_job\_pool.hpp.

8.92.4.7 `void uva::smt::bpbd::server::trans_job_pool::plan_new_job ( trans_job_ptr trans_job ) [inline]`

Allows to schedule a new translation job. The execution of the job is deferred and asynchronous. [\*trans\\_job\*](#) the translation job to be scheduled

Definition at line 180 of file trans\_job\_pool.hpp.

8.92.4.8 `void uva::smt::bpbd::server::trans_job_pool::process_finished_jobs ( ) [inline], [protected]`

Allows to process the finished translation jobs

Definition at line 383 of file trans\_job\_pool.hpp.

8.92.4.9 `void uva::smt::bpbd::server::trans_job_pool::report_run_time_info ( ) [inline]`

Allows to report the runtime information.

Definition at line 154 of file trans\_job\_pool.hpp.

8.92.4.10 void uva::smt::bpbd::server::trans\_job\_pool::set\_job\_result\_setter ( finished\_job\_notifier  
notify\_job\_finished\_func ) [inline]

Allows to set the response sender function for sending the replies to the client

## Parameters

|                                       |                                 |
|---------------------------------------|---------------------------------|
| <i>notify_job_↔<br/>finished_func</i> | the setter functional to be set |
|---------------------------------------|---------------------------------|

Definition at line 171 of file `trans_job_pool.hpp`.

#### 8.92.4.11 void uva::smt::bpbd::server::trans\_job\_pool::set\_num\_threads ( const size\_t num\_threads ) [inline]

Allows to set the new number of worker threads. This operation should be safe as the new threads are just added to the list and the deleted ones are let to finish their translation task execution.

## Parameters

|                    |                                  |
|--------------------|----------------------------------|
| <i>num_threads</i> | the new number of worker threads |
|--------------------|----------------------------------|

Definition at line 147 of file `trans_job_pool.hpp`.

#### 8.92.4.12 void uva::smt::bpbd::server::trans\_job\_pool::stop ( ) [inline]

Allows to stop all the running jobs and try to send all the responses and then exit

Definition at line 101 of file `trans_job_pool.hpp`.

#### 8.92.4.13 void uva::smt::bpbd::server::trans\_job\_pool::wake\_up\_jobs\_thread ( ) [inline], [protected]

Allows to wake up the jobs thread.

Definition at line 352 of file `trans_job_pool.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/trans_job_pool.hpp`

## 8.93 uva::smt::bpbd::common::messaging::trans\_job\_request Class Reference

```
#include <trans_job_request.hpp>
```

### Public Member Functions

- [trans\\_job\\_request](#) (const string &message)
- [trans\\_job\\_request](#) (const [job\\_id\\_type](#) job\_id, const string &source\_lang, const string &text, const string &target\_lang)
- void [de\\_serialize](#) (const string &message)
- const string [serialize](#) () const
- void [set\\_session\\_id](#) (const [session\\_id\\_type](#) session\_id)
- const [session\\_id\\_type](#) [get\\_session\\_id](#) () const
- const [job\\_id\\_type](#) [get\\_job\\_id](#) () const
- const string [get\\_source\\_lang](#) () const
- const string [get\\_target\\_lang](#) () const
- const string & [get\\_text](#) () const

### Static Public Attributes

- static constexpr char [HEADER\\_DELIMITER](#) = ':'
- static constexpr char [NEW\\_LINE\\_HEADER\\_ENDING](#) = '\n'
- static constexpr char [TEXT\\_SENTENCE\\_DELIMITER](#) = '\n'

### 8.93.1 Detailed Description

This class represents the translation request message.

Definition at line 53 of file trans\_job\_request.hpp.

### 8.93.2 Constructor & Destructor Documentation

8.93.2.1 `uva::smt::bpbd::common::messaging::trans_job_request::trans_job_request ( const string & message )`  
[inline]

This is the basic class constructor that accepts the original client message to parse. This constructor is to be used on the server to de-serialize the translation request.

Parameters

|                |                                             |
|----------------|---------------------------------------------|
| <i>message</i> | the client translation request to be parsed |
|----------------|---------------------------------------------|

Definition at line 67 of file trans\_job\_request.hpp.

8.93.2.2 `uva::smt::bpbd::common::messaging::trans_job_request::trans_job_request ( const job_id_type job_id, const string & source_lang, const string & text, const string & target_lang )` [inline]

This is the basic class constructor that accepts the translation job id, the translation text and source and target language strings.

Parameters

|                    |                                              |
|--------------------|----------------------------------------------|
| <i>job_id</i>      | the translation job id                       |
| <i>source_lang</i> | the source language string                   |
| <i>text</i>        | the text in the source language to translate |
| <i>target_lang</i> | the target language string                   |

Definition at line 81 of file trans\_job\_request.hpp.

### 8.93.3 Member Function Documentation

8.93.3.1 `void uva::smt::bpbd::common::messaging::trans_job_request::de_serialize ( const string & message )` [inline]

Allows to de-serialize the job request from a string

Parameters

|                |                                                          |
|----------------|----------------------------------------------------------|
| <i>message</i> | the string representation of the translation job request |
|----------------|----------------------------------------------------------|

Definition at line 91 of file trans\_job\_request.hpp.

8.93.3.2 `const job_id_type uva::smt::bpbd::common::messaging::trans_job_request::get_job_id ( ) const` [inline]

Allows to get the client-issued job id

Returns

the client-issued job id

Definition at line 164 of file trans\_job\_request.hpp.

**8.93.3.3** `const session_id_type uva::smt::bpbd::common::messaging::trans_job_request::get_session_id ( ) const` `[inline]`

Allows to get the translation session id. This method to be used on the client, for the sake of storing the session id by the translation job request class.

**Returns**

the session id issued by the server

Definition at line 156 of file `trans_job_request.hpp`.

**8.93.3.4** `const string uva::smt::bpbd::common::messaging::trans_job_request::get_source_lang ( ) const` `[inline]`

Allows to get the translation job source language

**Returns**

the translation job source language

Definition at line 172 of file `trans_job_request.hpp`.

**8.93.3.5** `const string uva::smt::bpbd::common::messaging::trans_job_request::get_target_lang ( ) const` `[inline]`

Allows to get the translation job target language

**Returns**

the translation job target language

Definition at line 180 of file `trans_job_request.hpp`.

**8.93.3.6** `const string& uva::smt::bpbd::common::messaging::trans_job_request::get_text ( ) const` `[inline]`

Allows to get the translation job text. This is either the text translated into the target language or the error message for the case of failed translation job request.

**Returns**

the translation job text

Definition at line 190 of file `trans_job_request.hpp`.

**8.93.3.7** `const string uva::smt::bpbd::common::messaging::trans_job_request::serialize ( ) const` `[inline]`

Allows to serialize the job request into a string

**Returns**

the string representation of the translation job request

Definition at line 130 of file `trans_job_request.hpp`.

**8.93.3.8** `void uva::smt::bpbd::common::messaging::trans_job_request::set_session_id ( const session_id_type session_id )` `[inline]`

Allows to set the translation session id. This method to be used on the client, for the sake of storing the session id by the translation job request class.



## Parameters

|                            |                                     |
|----------------------------|-------------------------------------|
| <a href="#">session_id</a> | the session id issued by the server |
|----------------------------|-------------------------------------|

Definition at line 146 of file trans\_job\_request.hpp.

### 8.93.4 Member Data Documentation

8.93.4.1 `constexpr char uva::smt::bpbd::common::messaging::trans_job_request::HEADER_DELIMITER = ':'` `[static]`

Definition at line 56 of file trans\_job\_request.hpp.

8.93.4.2 `constexpr char uva::smt::bpbd::common::messaging::trans_job_request::NEW_LINE_HEADER_ENDING = '\n'` `[static]`

Definition at line 57 of file trans\_job\_request.hpp.

8.93.4.3 `constexpr char uva::smt::bpbd::common::messaging::trans_job_request::TEXT_SENTENCE_DELIMITER = '\n'` `[static]`

Definition at line 58 of file trans\_job\_request.hpp.

The documentation for this class was generated from the following file:

- inc/common/messaging/trans\_job\_request.hpp

## 8.94 uva::smt::bpbd::common::messaging::trans\_job\_response Class Reference

```
#include <trans_job_response.hpp>
```

### Public Member Functions

- [trans\\_job\\_response](#) ()
- [trans\\_job\\_response](#) (const string &message)
- [trans\\_job\\_response](#) (const [job\\_id\\_type](#) job\_id, const [trans\\_job\\_code](#) code, const string &text)
- void [de\\_serialize](#) (const string &message)
- const string [serialize](#) ()
- const [job\\_id\\_type](#) [get\\_job\\_id](#) () const
- const bool [is\\_job\\_id\\_defined](#) () const
- const bool [is\\_good](#) () const
- const [trans\\_job\\_code](#) [get\\_code](#) () const
- const string & [get\\_text](#) () const

### Static Public Attributes

- static constexpr char [HEADER\\_DELIMITER](#) = ':'
- static constexpr char [NEW\\_LINE\\_HEADER\\_ENDING](#) = '\n'

#### 8.94.1 Detailed Description

This class represents the translation reply message, which is a translation result for a translation job. This result can be a text in the target language or it can be an error.

Definition at line 63 of file trans\_job\_response.hpp.

## 8.94.2 Constructor & Destructor Documentation

### 8.94.2.1 `uva::smt::bpbd::common::messaging::trans_job_response::trans_job_response ( )` `[inline]`

The basic no-argument constructor that is needed for the translation client. It default-initializes the class with unde-fined values.

Definition at line 73 of file `trans_job_response.hpp`.

### 8.94.2.2 `uva::smt::bpbd::common::messaging::trans_job_response::trans_job_response ( const string & message )` `[inline]`

This is the basic class constructor that accepts the original server message to parse. This constructor is to be used on the client to de-serialize the resulting message.

#### Parameters

|                |                                 |
|----------------|---------------------------------|
| <i>message</i> | the server message to be parsed |
|----------------|---------------------------------|

Definition at line 84 of file `trans_job_response.hpp`.

### 8.94.2.3 `uva::smt::bpbd::common::messaging::trans_job_response::trans_job_response ( const job_id_type job_id, const trans_job_code code, const string & text )` `[inline]`

This is the basic class constructor that accepts the translation job id, the translation result code and the text.

#### Parameters

|               |                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------|
| <i>job_id</i> | the client-issued id of the translation job                                                                      |
| <i>code</i>   | the translation job result code                                                                                  |
| <i>text</i>   | the translation job result text, either the translated text or the error message corresponding to the error code |

Definition at line 99 of file `trans_job_response.hpp`.

## 8.94.3 Member Function Documentation

### 8.94.3.1 `void uva::smt::bpbd::common::messaging::trans_job_response::de_serialize ( const string & message )` `[inline]`

Allows to de-serialize the job reply from a string

#### Parameters

|                |                                                        |
|----------------|--------------------------------------------------------|
| <i>message</i> | the string representation of the translation job reply |
|----------------|--------------------------------------------------------|

Definition at line 107 of file `trans_job_response.hpp`.

### 8.94.3.2 `const trans_job_code uva::smt::bpbd::common::messaging::trans_job_response::get_code ( )` `const` `[inline]`

Allows to get the translation job result code

#### Returns

the translation job result code

Definition at line 179 of file `trans_job_response.hpp`.

**8.94.3.3** `const job_id_type uva::smt::bpbd::common::messaging::trans_job_response::get_job_id ( ) const` `[inline]`

Allows to get the client-issued job id

**Returns**

the client-issued job id

Definition at line 154 of file `trans_job_response.hpp`.

**8.94.3.4** `const string& uva::smt::bpbd::common::messaging::trans_job_response::get_text ( ) const` `[inline]`

Allows to get the translation job text. This is either the text translated into the target language or the error message for the case of failed translation job request.

**Returns**

the translation job text

Definition at line 189 of file `trans_job_response.hpp`.

**8.94.3.5** `const bool uva::smt::bpbd::common::messaging::trans_job_response::is_good ( ) const` `[inline]`

Allows to check if the reply is good, i.e. contains the translated text and not the error message

**Returns**

true if the reply is good and contains the translated text.

Definition at line 171 of file `trans_job_response.hpp`.

**8.94.3.6** `const bool uva::smt::bpbd::common::messaging::trans_job_response::is_job_id_defined ( ) const` `[inline]`

Allows to check whether the job id is defined, is not equal to `job_id::UNDEFINED_JOB_ID`;

**Returns**

true if the job id is defined, otherwise false

Definition at line 163 of file `trans_job_response.hpp`.

**8.94.3.7** `const string uva::smt::bpbd::common::messaging::trans_job_response::serialize ( )` `[inline]`

Allows to serialize the job reply into a string

**Returns**

the string representation of the translation job reply

Definition at line 141 of file `trans_job_response.hpp`.

## 8.94.4 Member Data Documentation

**8.94.4.1** `constexpr char uva::smt::bpbd::common::messaging::trans_job_response::HEADER_DELIMITER = ':'` `[static]`

Definition at line 66 of file `trans_job_response.hpp`.

8.94.4.2 `constexpr char uva::smt::bpbd::common::messaging::trans_job_response::NEW_LINE_HEADER_ENDING = '\n'`  
`[static]`

Definition at line 67 of file `trans_job_response.hpp`.

The documentation for this class was generated from the following file:

- `inc/common/messaging/trans_job_response.hpp`

## 8.95 `uva::smt::bpbd::client::trans_job_status` Class Reference

`#include <trans_job_status.hpp>`

### Public Types

- enum `values` {  
`STATUS_UNDEFINED` = 0, `STATUS_REQ_INITIALIZED` = `STATUS_UNDEFINED` + 1, `STATUS_REQ_SENT_GOOD` = `STATUS_REQ_INITIALIZED` + 1, `STATUS_REQ_SENT_FAIL` = `STATUS_REQ_SENT_GOOD` + 1,  
`STATUS_RES_RECEIVED` = `STATUS_REQ_SENT_FAIL` + 1, `size` = `STATUS_RES_RECEIVED` + 1 }

### Public Member Functions

- `trans_job_status` (const `values` status)
- `trans_job_status` (const `int32_t` status\_val)
- `trans_job_status` ()
- void `operator=` (const `values` &status)
- bool `operator==` (const `values` &status) const
- bool `operator<` (const `values` &status) const
- `operator string` () const
- `operator int` () const
- const char \*const `str` () const

### 8.95.1 Detailed Description

This class represents the translation job status. It is to be used on the client. It is needed to trace the client-side translation job status.

Definition at line 48 of file `trans_job_status.hpp`.

### 8.95.2 Member Enumeration Documentation

8.95.2.1 enum `uva::smt::bpbd::client::trans_job_status::values`

Stores the possible status values of the client-side translation job

Enumerator

**`STATUS_UNDEFINED`**  
**`STATUS_REQ_INITIALIZED`**  
**`STATUS_REQ_SENT_GOOD`**  
**`STATUS_REQ_SENT_FAIL`**  
**`STATUS_RES_RECEIVED`**

**size**

Definition at line 54 of file trans\_job\_status.hpp.

**8.95.3 Constructor & Destructor Documentation**

**8.95.3.1** `uva::smt::bpbd::client::trans_job_status::trans_job_status ( const values status )` `[inline]`

The basic constructor that allows to initialize the value with the status

Parameters

|               |                                     |
|---------------|-------------------------------------|
| <i>status</i> | the status value to initialize with |
|---------------|-------------------------------------|

Definition at line 67 of file trans\_job\_status.hpp.

**8.95.3.2** `uva::smt::bpbd::client::trans_job_status::trans_job_status ( const int32_t status_val )` `[inline]`

The basic constructor that allows to initialize the value from an integer

Parameters

|                   |                                     |
|-------------------|-------------------------------------|
| <i>status_val</i> | the status value to initialize with |
|-------------------|-------------------------------------|

Definition at line 74 of file trans\_job\_status.hpp.

**8.95.3.3** `uva::smt::bpbd::client::trans_job_status::trans_job_status ( )` `[inline]`

The basic constructor that creates an undefined value

Definition at line 86 of file trans\_job\_status.hpp.

**8.95.4 Member Function Documentation**

**8.95.4.1** `uva::smt::bpbd::client::trans_job_status::operator int ( ) const` `[inline]`

The operator allowing to convert the value to an integer

Returns

the the integer value

Definition at line 125 of file trans\_job\_status.hpp.

**8.95.4.2** `uva::smt::bpbd::client::trans_job_status::operator string ( ) const` `[inline]`

The operator allowing to convert the value to string

Returns

the string representation of the code

Definition at line 117 of file trans\_job\_status.hpp.

**8.95.4.3** `bool uva::smt::bpbd::client::trans_job_status::operator< ( const values & status ) const` `[inline]`

Overloading the comparison operator for the status

## Parameters

|               |                            |
|---------------|----------------------------|
| <i>status</i> | the status to compare with |
|---------------|----------------------------|

Definition at line 109 of file `trans_job_status.hpp`.

**8.95.4.4** `void uva::smt::bpbd::client::trans_job_status::operator= ( const values & status ) [inline]`

Overloading the assignment operator for the status

## Parameters

|               |                   |
|---------------|-------------------|
| <i>status</i> | the status to set |
|---------------|-------------------|

Definition at line 93 of file `trans_job_status.hpp`.

**8.95.4.5** `bool uva::smt::bpbd::client::trans_job_status::operator== ( const values & status ) const [inline]`

Overloading the equality operator for the status

## Parameters

|               |                                   |
|---------------|-----------------------------------|
| <i>status</i> | the status to check equality with |
|---------------|-----------------------------------|

Definition at line 101 of file `trans_job_status.hpp`.

**8.95.4.6** `const char *const uva::smt::bpbd::client::trans_job_status::str ( ) const`

Allows to get the job status string for reporting

## Returns

the job status string

Definition at line 49 of file `trans_job_status.cpp`.

The documentation for this class was generated from the following files:

- [inc/client/trans\\_job\\_status.hpp](#)
- [src/client/trans\\_job\\_status.cpp](#)

## 8.96 uva::smt::bpbd::server::trans\_manager Class Reference

```
#include <trans_manager.hpp>
```

### Public Types

- `typedef function< void(websocketpp::connection_hdl, trans_job_response &) > response_sender`
- `typedef std::map< websocketpp::connection_hdl, session_id_type, std::owner_less< websocketpp::connection_hdl > > sessions_map_type`
- `typedef std::map< session_id_type, websocketpp::connection_hdl > handlers_map_type`
- `typedef handlers_map_type::iterator handlers_map_iter_type`

## Public Member Functions

- [trans\\_manager](#) (const size\_t num\_threads)
- void [set\\_response\\_sender](#) ([response\\_sender](#) sender)
- virtual [~trans\\_manager](#) ()
- void [set\\_num\\_threads](#) (const size\_t num\_threads)
- void [report\\_run\\_time\\_info](#) ()
- void [open\\_session](#) (websocketpp::connection\_hdl hdl)
- void [translate](#) (websocketpp::connection\_hdl hdl, [trans\\_job\\_request\\_ptr](#) request\_ptr)
- void [close\\_session](#) (websocketpp::connection\_hdl hdl)
- void [stop](#) ()

## Protected Member Functions

- void [notify\\_job\\_finished](#) ([trans\\_job\\_ptr](#) trans\_job)

### 8.96.1 Detailed Description

This is a synchronized translation sessions manager class that stores that keeps track of the open translation sessions and their objects.

Definition at line 59 of file `trans_manager.hpp`.

### 8.96.2 Member Typedef Documentation

8.96.2.1 `typedef handlers_map_type::iterator uva::smt::bpbd::server::trans_manager::handlers_map_iter_type`

Definition at line 68 of file `trans_manager.hpp`.

8.96.2.2 `typedef std::map<session_id_type, websocketpp::connection_hdl> uva::smt::bpbd::server::trans_↵  
manager::handlers_map_type`

Definition at line 67 of file `trans_manager.hpp`.

8.96.2.3 `typedef function<void(websocketpp::connection_hdl, trans_job_response &) >  
uva::smt::bpbd::server::trans_manager::response_sender`

Definition at line 63 of file `trans_manager.hpp`.

8.96.2.4 `typedef std::map<websocketpp::connection_hdl, session_id_type, std::owner_less<websocketpp::connection_↵  
hdl> > uva::smt::bpbd::server::trans_manager::sessions_map_type`

Definition at line 66 of file `trans_manager.hpp`.

### 8.96.3 Constructor & Destructor Documentation

8.96.3.1 `uva::smt::bpbd::server::trans_manager::trans_manager ( const size_t num_threads ) [inline]`

The basic constructor.

## Parameters

|                    |                                          |
|--------------------|------------------------------------------|
| <i>num_threads</i> | the number of translation threads to run |
|--------------------|------------------------------------------|

**Todo** {Possibly limit the number of allowed open sessions (from one host and the maximum amount of allowed hosts) This is for later, if the server is put for www access.}

Definition at line 78 of file trans\_manager.hpp.

8.96.3.2 `virtual uva::smt::bpbd::server::trans_manager::~~trans_manager ( ) [inline],[virtual]`

The basic destructor

Definition at line 95 of file trans\_manager.hpp.

## 8.96.4 Member Function Documentation

8.96.4.1 `void uva::smt::bpbd::server::trans_manager::close_session ( websocketpp::connection_hdl hdl ) [inline]`

Allows to erase the session object from the map and return the stored object, synchronized. Returns NULL if there was no session object associated with the given handler.

## Parameters

|            |                                                        |
|------------|--------------------------------------------------------|
| <i>hdl</i> | the connection handler to identify the session object. |
|------------|--------------------------------------------------------|

## Returns

the session object to be removed, is to be deallocated by the caller.

Definition at line 187 of file trans\_manager.hpp.

8.96.4.2 `void uva::smt::bpbd::server::trans_manager::notify_job_finished ( trans_job_ptr trans_job ) [inline],[protected]`

Allows to set the non-error translation result, this will also send the response to the client.

## Parameters

|                  |                                             |
|------------------|---------------------------------------------|
| <i>trans_job</i> | the pointer to the finished translation job |
|------------------|---------------------------------------------|

Definition at line 235 of file trans\_manager.hpp.

8.96.4.3 `void uva::smt::bpbd::server::trans_manager::open_session ( websocketpp::connection_hdl hdl ) [inline]`

Allows to create and register a new session object, synchronized. If for some reason a new session can not be opened, an exception is thrown.

## Parameters

|            |                                                             |
|------------|-------------------------------------------------------------|
| <i>hdl</i> | [in] the connection handler to identify the session object. |
|------------|-------------------------------------------------------------|

Definition at line 124 of file trans\_manager.hpp.

8.96.4.4 `void uva::smt::bpbd::server::trans_manager::report_run_time_info ( ) [inline]`

Allows to report the runtime information.

Definition at line 114 of file trans\_manager.hpp.



8.96.4.5 `void uva::smt::bpbd::server::trans_manager::set_num_threads ( const size_t num_threads ) [inline]`

Allows to set the new number of worker threads. This operation should be safe as the new threads are just added to the list and the deleted ones are let to finish their translation task execution.

Parameters

|                    |                                  |
|--------------------|----------------------------------|
| <i>num_threads</i> | the new number of worker threads |
|--------------------|----------------------------------|

Definition at line 107 of file `trans_manager.hpp`.

8.96.4.6 `void uva::smt::bpbd::server::trans_manager::set_response_sender ( response_sender sender ) [inline]`

Allows to set the response sender function for sending the replies to the client

Parameters

|               |                                  |
|---------------|----------------------------------|
| <i>sender</i> | the s ender functional to be set |
|---------------|----------------------------------|

Definition at line 88 of file `trans_manager.hpp`.

8.96.4.7 `void uva::smt::bpbd::server::trans_manager::stop ( ) [inline]`

Allows to stop the translation manager, i.e. cancel all the jobs and move on.

Definition at line 223 of file `trans_manager.hpp`.

8.96.4.8 `void uva::smt::bpbd::server::trans_manager::translate ( websocketpp::connection_hdl hdl, trans_job_request_ptr request_ptr ) [inline]`

Allows to schedule a new translation request, synchronized. If there is not session associated with the given connection handler then will through. The scheduled translation job request is from this moment on a responsibility of the underlying object to be managed.

Parameters

|                    |                                                             |
|--------------------|-------------------------------------------------------------|
| <i>hdl</i>         | [in] the connection handler to identify the session object. |
| <i>request_ptr</i> | [in] the translation job request to be stored, not NULL     |

Definition at line 151 of file `trans_manager.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/trans_manager.hpp`

## 8.97 uva::smt::bpbd::client::trans\_manager Class Reference

```
#include <trans_manager.hpp>
```

### Public Types

- typedef vector< [trans\\_job\\_ptr](#) > [jobs\\_list\\_type](#)
- typedef jobs\_list\_type::iterator [jobs\\_list\\_iter\\_type](#)
- typedef unordered\_map< [job\\_id\\_type](#), [trans\\_job\\_ptr](#) > [jobs\\_map\\_type](#)
- typedef jobs\_map\_type::iterator [jobs\\_map\\_iter\\_type](#)

## Public Member Functions

- [trans\\_manager](#) (const [client\\_config](#) &params)
- virtual [~trans\\_manager](#) ()
- void [start](#) ()
- void [wait](#) ()
- void [stop](#) ()

## Static Public Attributes

- static constexpr uint64\_t [MIN\\_SENTENCES\\_PER\\_REQUEST](#) = 1

## Protected Member Functions

- void [write\\_received\\_job\\_result](#) (const uint32\_t fis, const uint32\_t lis, const [trans\\_job\\_ptr](#) job, ofstream &target\_file)
- void [write\\_result\\_to\\_file](#) ()
- void [check\\_jobs\\_done\\_and\\_notify](#) ()
- void [set\\_job\\_response](#) ([trans\\_job\\_response](#) \*trans\_job\_resp)
- void [notify\\_conn\\_closed](#) ()
- void [notify\\_jobs\\_done](#) ()
- void [notify\\_jobs\\_sent](#) ()
- void [send\\_translation\\_jobs](#) ()
- uint64\_t [get\\_num\\_of\\_sentences](#) ()

### 8.97.1 Detailed Description

This is the client side translation manager class. It's task is to get the source text from a file and then split it into a number of translation jobs that will be sent to the translation server. The finished translation jobs are collected and once all of them are finished the resulting text is written into the output file.

Definition at line 69 of file [trans\\_manager.hpp](#).

### 8.97.2 Member Typedef Documentation

#### 8.97.2.1 typedef jobs\_list\_type::iterator uva::smt::bpbd::client::trans\_manager::jobs\_list\_iter\_type

Definition at line 77 of file [trans\\_manager.hpp](#).

#### 8.97.2.2 typedef vector<trans\_job\_ptr> uva::smt::bpbd::client::trans\_manager::jobs\_list\_type

Definition at line 76 of file [trans\\_manager.hpp](#).

#### 8.97.2.3 typedef jobs\_map\_type::iterator uva::smt::bpbd::client::trans\_manager::jobs\_map\_iter\_type

Definition at line 80 of file [trans\\_manager.hpp](#).

#### 8.97.2.4 typedef unordered\_map<job\_id\_type, trans\_job\_ptr> uva::smt::bpbd::client::trans\_manager::jobs\_map\_type

Definition at line 79 of file [trans\\_manager.hpp](#).

### 8.97.3 Constructor & Destructor Documentation

8.97.3.1 `uva::smt::bpbd::client::trans_manager::trans_manager ( const client_config & params ) [inline]`

This is the basic constructor needed to

Parameters

|               |                                   |
|---------------|-----------------------------------|
| <i>params</i> | the translation client parameters |
|---------------|-----------------------------------|

Definition at line 86 of file trans\_manager.hpp.

8.97.3.2 `virtual uva::smt::bpbd::client::trans_manager::~~trans_manager ( ) [inline],[virtual]`

The basic destructor class

Definition at line 126 of file trans\_manager.hpp.

### 8.97.4 Member Function Documentation

8.97.4.1 `void uva::smt::bpbd::client::trans_manager::check_jobs_done_and_notify ( ) [inline],[protected]`

Allows to check if all the jobs are done and then perform a notifying action

Definition at line 290 of file trans\_manager.hpp.

8.97.4.2 `uint64_t uva::smt::bpbd::client::trans_manager::get_num_of_sentences ( ) [inline],[protected]`

Allows to compute the number of sentences to send with the next request

Returns

the number of sentences to send with the next request

Definition at line 425 of file trans\_manager.hpp.

8.97.4.3 `void uva::smt::bpbd::client::trans_manager::notify_conn_closed ( ) [inline],[protected]`

This function will be called if the connection is closed during the translation process

Definition at line 337 of file trans\_manager.hpp.

8.97.4.4 `void uva::smt::bpbd::client::trans_manager::notify_jobs_done ( ) [inline],[protected]`

Allows to notify the threads waiting on the translation jobs to be received

Definition at line 356 of file trans\_manager.hpp.

8.97.4.5 `void uva::smt::bpbd::client::trans_manager::notify_jobs_sent ( ) [inline],[protected]`

Allows to notify the threads waiting on the translation jobs to be sent

Definition at line 372 of file trans\_manager.hpp.

**8.97.4.6** void uva::smt::bpbd::client::trans\_manager::send\_translation\_jobs ( ) [inline], [protected]

This function shall be run in a separate thread and send a number of translation job requests to the server.

Definition at line 388 of file trans\_manager.hpp.

**8.97.4.7** void uva::smt::bpbd::client::trans\_manager::set\_job\_response ( trans\_job\_response \* trans\_job\_resp ) [inline], [protected]

Allows to process the server job request response

Parameters

|                       |                                                     |
|-----------------------|-----------------------------------------------------|
| <i>trans_job_resp</i> | the translation job response coming from the server |
|-----------------------|-----------------------------------------------------|

Definition at line 301 of file trans\_manager.hpp.

**8.97.4.8** void uva::smt::bpbd::client::trans\_manager::start ( ) [inline]

Allows to start the translation process

Definition at line 144 of file trans\_manager.hpp.

**8.97.4.9** void uva::smt::bpbd::client::trans\_manager::stop ( ) [inline]

This method allows to stop the translation client and to write the resulting translations into the file.

Definition at line 188 of file trans\_manager.hpp.

**8.97.4.10** void uva::smt::bpbd::client::trans\_manager::wait ( ) [inline]

Allows to wait until the translations are done

Definition at line 156 of file trans\_manager.hpp.

**8.97.4.11** void uva::smt::bpbd::client::trans\_manager::write\_received\_job\_result ( const uint32\_t fis, const uint32\_t lis, const trans\_job\_ptr job, ofstream & target\_file ) [inline], [protected]

Allows to write the received translation job replies into the file

Parameters

|                    |                           |
|--------------------|---------------------------|
| <i>fis</i>         | the first sentence number |
| <i>lis</i>         | the last sentence number  |
| <i>job</i>         | the translation job data  |
| <i>target_file</i> | the file to write to      |

Definition at line 215 of file trans\_manager.hpp.

**8.97.4.12** void uva::smt::bpbd::client::trans\_manager::write\_result\_to\_file ( ) [inline], [protected]

Allows to generate the translation result file.

Definition at line 242 of file trans\_manager.hpp.

## 8.97.5 Member Data Documentation

8.97.5.1 `constexpr uint64_t uva::smt::bpbd::client::trans_manager::MIN_SENTENCES_PER_REQUEST = 1` `[static]`

Definition at line 73 of file `trans_manager.hpp`.

The documentation for this class was generated from the following file:

- `inc/client/trans_manager.hpp`

## 8.98 uva::smt::bpbd::server::trans\_task Class Reference

```
#include <trans_task.hpp>
```

### Public Types

- `typedef function< void(trans_task_ptr) > done_task_notifier`
- `typedef function< void(trans_task_ptr) > cancel_task_notifier`

### Public Member Functions

- `trans_task` (const `session_id_type` session\_id, const `job_id_type` job\_id, const `task_id_type` task\_id, const string &source\_sentence, `done_task_notifier` notify\_task\_done\_func)
- `virtual ~trans_task` ()
- `void set_cancel_task_notifier` (`cancel_task_notifier` notify\_task\_cancel\_func)
- `void cancel` ()
- `void translate` ()
- `const task_id_type get_task_id` () const
- `const trans_job_code get_code` () const
- `const string & get_source_text` () const
- `const string & get_target_text` ()

### Protected Member Functions

- `void process_task_result` ()

### 8.98.1 Detailed Description

This class represents the translation task. Every translation task is a sentence to be translated and its id.

Definition at line 61 of file `trans_task.hpp`.

### 8.98.2 Member Typedef Documentation

8.98.2.1 `typedef function<void(trans_task_ptr) > uva::smt::bpbd::server::trans_task::cancel_task_notifier`

Definition at line 66 of file `trans_task.hpp`.

8.98.2.2 `typedef function<void(trans_task_ptr) > uva::smt::bpbd::server::trans_task::done_task_notifier`

Definition at line 64 of file `trans_task.hpp`.

### 8.98.3 Constructor & Destructor Documentation

8.98.3.1 `uva::smt::bpbd::server::trans_task::trans_task ( const session_id_type session_id, const job_id_type job_id,  
const task_id_type task_id, const string & source_sentence, done_task_notifier notify_task_done_func )`  
[inline]

The basic constructor allowing to initialize the main class constants

## Parameters

|                              |                                                           |
|------------------------------|-----------------------------------------------------------|
| <i>session_id</i>            | the session id of the task, is used for logging           |
| <i>job_id</i>                | the job id of the task, is used for logging               |
| <i>task_id</i>               | the id of the translation task within the translation job |
| <i>source_↔<br/>sentence</i> | the sentence to be translated                             |

Definition at line 75 of file trans\_task.hpp.

**8.98.3.2** `virtual uva::smt::bpbd::server::trans_task::~~trans_task ( ) [inline],[virtual]`

The basic destructor

Definition at line 88 of file trans\_task.hpp.

## 8.98.4 Member Function Documentation

**8.98.4.1** `void uva::smt::bpbd::server::trans_task::cancel ( ) [inline]`

Allows to cancel the translation task

Definition at line 104 of file trans\_task.hpp.

**8.98.4.2** `const trans_job_code uva::smt::bpbd::server::trans_task::get_code ( ) const [inline]`

Allows to retrieve the translation task result code

### Returns

the translation task result code

Definition at line 176 of file trans\_task.hpp.

**8.98.4.3** `const string& uva::smt::bpbd::server::trans_task::get_source_text ( ) const [inline]`

Allows to retrieve the sentence in the source language

### Returns

the sentence in the source language

Definition at line 184 of file trans\_task.hpp.

**8.98.4.4** `const string& uva::smt::bpbd::server::trans_task::get_target_text ( ) [inline]`

Allows to retrieve the sentence in the target language or an error message

### Returns

the sentence in the target language or an error message

Definition at line 192 of file trans\_task.hpp.

**8.98.4.5** `const task_id_type uva::smt::bpbd::server::trans_task::get_task_id( ) const` `[inline]`

Allows to retrieve the task id

Returns

the task id

Definition at line 168 of file `trans_task.hpp`.

**8.98.4.6** `void uva::smt::bpbd::server::trans_task::process_task_result( )` `[inline]`, `[protected]`

Allows to process the translation task result in case of a successful and abnormal task termination. This includes sending the notification to the translation job that the task is finished. NOTE: This method is not thread safe!

Definition at line 208 of file `trans_task.hpp`.

**8.98.4.7** `void uva::smt::bpbd::server::trans_task::set_cancel_task_notifier( cancel_task_notifier notify_task_cancel_func )` `[inline]`

Allows to set the function which must be called by the tasks if it is being cancelled.

Parameters

|                                      |                                                            |
|--------------------------------------|------------------------------------------------------------|
| <i>notify_task ↔<br/>cancel_func</i> | the function to call in case this task is being cancelled. |
|--------------------------------------|------------------------------------------------------------|

Definition at line 96 of file `trans_task.hpp`.

**8.98.4.8** `void uva::smt::bpbd::server::trans_task::translate( )` `[inline]`

Performs the translation for the given sentence

Definition at line 126 of file `trans_task.hpp`.

The documentation for this class was generated from the following file:

- [inc/server/trans\\_task.hpp](#)

## 8.99 uva::smt::bpbd::server::trans\_task\_pool Class Reference

```
#include <trans_task_pool.hpp>
```

### Public Types

- typedef deque< [trans\\_task\\_ptr](#) > [tasks\\_queue\\_type](#)
- typedef tasks\_queue\_type::iterator [tasks\\_queue\\_iter\\_type](#)
- typedef vector< thread > [threads\\_list\\_type](#)
- typedef vector< [trans\\_task\\_pool\\_worker](#) \* > [workers\\_list\\_type](#)

### Public Member Functions

- [trans\\_task\\_pool](#) (const size\_t num\_threads)
- void [set\\_num\\_threads](#) (const size\_t num\_threads)
- void [report\\_run\\_time\\_info](#) ()
- virtual [~trans\\_task\\_pool](#) ()
- void [plan\\_new\\_task](#) ([trans\\_task\\_ptr](#) trans\_task)



## Protected Member Functions

- void [notify\\_task\\_cancel](#) ([trans\\_task\\_ptr](#) [trans\\_task](#))

## Protected Attributes

- [tasks\\_queue\\_type](#) [m\\_tasks](#)
- mutex [m\\_queue\\_mutex](#)
- condition\_variable [m\\_condition](#)
- atomic< bool > [m\\_stop](#)

## Friends

- class [trans\\_task\\_pool\\_worker](#)

### 8.99.1 Detailed Description

This class represents a translation tasks pool which is in essence a thread pool. One should add the translation tasks into this class and using the pre-configured number of threads it will execute these tasks one by one. This class is thread safe.

Definition at line 32 of file [trans\\_task\\_pool.hpp](#).

### 8.99.2 Member Typedef Documentation

8.99.2.1 `typedef tasks_queue_type::iterator uva::smt::bpbd::server::trans_task_pool::tasks_queue_iter_type`

Definition at line 37 of file [trans\\_task\\_pool.hpp](#).

8.99.2.2 `typedef deque<trans_task_ptr> uva::smt::bpbd::server::trans_task_pool::tasks_queue_type`

Definition at line 36 of file [trans\\_task\\_pool.hpp](#).

8.99.2.3 `typedef vector<thread> uva::smt::bpbd::server::trans_task_pool::threads_list_type`

Definition at line 40 of file [trans\\_task\\_pool.hpp](#).

8.99.2.4 `typedef vector<trans_task_pool_worker*> uva::smt::bpbd::server::trans_task_pool::workers_list_type`

Definition at line 42 of file [trans\\_task\\_pool.hpp](#).

### 8.99.3 Constructor & Destructor Documentation

8.99.3.1 `uva::smt::bpbd::server::trans_task_pool ( const size_t num_threads )`

This is a basic constructor accepting the number of threads parameter.

## Parameters

|                    |                                                    |
|--------------------|----------------------------------------------------|
| <i>num_threads</i> | the number of threads to be run by this task pool. |
|--------------------|----------------------------------------------------|

Definition at line 38 of file trans\_task\_pool.cpp.

#### 8.99.3.2 uva::smt::bpbd::server::trans\_task\_pool::~~trans\_task\_pool ( ) [virtual]

The class destructor

Definition at line 108 of file trans\_task\_pool.cpp.

### 8.99.4 Member Function Documentation

#### 8.99.4.1 void uva::smt::bpbd::server::trans\_task\_pool::notify\_task\_cancel ( trans\_task\_ptr trans\_task ) [protected]

The method that will be called in case a task is canceled

## Parameters

|                   |                                 |
|-------------------|---------------------------------|
| <i>trans_task</i> | the task that is being canceled |
|-------------------|---------------------------------|

**Todo** {To improve performance we could try checking if the tasks is already running, and if not then search the queue. Or use other data structure for a more efficient task removal. This is for the future, in case the performance is affected.}

Definition at line 128 of file trans\_task\_pool.cpp.

#### 8.99.4.2 void uva::smt::bpbd::server::trans\_task\_pool::plan\_new\_task ( trans\_task\_ptr trans\_task )

This method allows to plan a new translation task

## Parameters

|                   |                              |
|-------------------|------------------------------|
| <i>trans_task</i> | the translation task to plan |
|-------------------|------------------------------|

Definition at line 150 of file trans\_task\_pool.cpp.

#### 8.99.4.3 void uva::smt::bpbd::server::trans\_task\_pool::report\_run\_time\_info ( ) [inline]

Allows to report the runtime information.

Definition at line 61 of file trans\_task\_pool.hpp.

#### 8.99.4.4 void uva::smt::bpbd::server::trans\_task\_pool::set\_num\_threads ( const size\_t new\_num\_threads )

Allows to set the new number of worker threads. This operation should be safe as the new threads are just added to the list and the deleted ones are let to finish their translation task execution.

## Parameters

|                    |                                  |
|--------------------|----------------------------------|
| <i>num_threads</i> | the new number of worker threads |
|--------------------|----------------------------------|

Allows to set the new number of worker threads

## Parameters

|                              |                                  |
|------------------------------|----------------------------------|
| <code>new_num_threads</code> | the new number of worker threads |
|------------------------------|----------------------------------|

Definition at line 52 of file `trans_task_pool.cpp`.

## 8.99.5 Friends And Related Function Documentation

### 8.99.5.1 friend class `trans_task_pool_worker` [friend]

Definition at line 93 of file `trans_task_pool.hpp`.

## 8.99.6 Member Data Documentation

### 8.99.6.1 condition\_variable `uva::smt::bpbd::server::trans_task_pool::m_condition` [protected]

Definition at line 100 of file `trans_task_pool.hpp`.

### 8.99.6.2 mutex `uva::smt::bpbd::server::trans_task_pool::m_queue_mutex` [protected]

Definition at line 99 of file `trans_task_pool.hpp`.

### 8.99.6.3 atomic<bool> `uva::smt::bpbd::server::trans_task_pool::m_stop` [protected]

Definition at line 103 of file `trans_task_pool.hpp`.

### 8.99.6.4 tasks\_queue\_type `uva::smt::bpbd::server::trans_task_pool::m_tasks` [protected]

Definition at line 96 of file `trans_task_pool.hpp`.

The documentation for this class was generated from the following files:

- [inc/server/trans\\_task\\_pool.hpp](#)
- [src/server/trans\\_task\\_pool.cpp](#)

## 8.100 uva::smt::bpbd::server::trans\_task\_pool\_worker Class Reference

```
#include <trans_task_pool_worker.hpp>
```

### Public Member Functions

- [trans\\_task\\_pool\\_worker](#) ([trans\\_task\\_pool](#) &pool)
- virtual [~trans\\_task\\_pool\\_worker](#) ()
- void [stop](#) ()
- atomic< bool > & [is\\_busy](#) ()
- void [operator\(\)](#) ()

### 8.100.1 Detailed Description

This class represents a translation tasks pool worker. This is class is to be used around the actual translation task inside the translation tasks pool. We need this class as a synchronization layer for the thread pool, as each of instances of this class will be run by a thread.

Definition at line 50 of file `trans_task_pool_worker.hpp`.

### 8.100.2 Constructor & Destructor Documentation

**8.100.2.1** `uva::smt::bpbd::server::trans_task_pool_worker::trans_task_pool_worker ( trans_task_pool & pool )`  
`[inline]`

This is a basic constructor that needs the thread pool reference as an argument.

Parameters

|             |                         |
|-------------|-------------------------|
| <i>pool</i> | the task pool reference |
|-------------|-------------------------|

Definition at line 57 of file `trans_task_pool_worker.hpp`.

**8.100.2.2** `virtual uva::smt::bpbd::server::trans_task_pool_worker::~~trans_task_pool_worker ( )` `[inline]`,  
`[virtual]`

The basic destructor

Definition at line 64 of file `trans_task_pool_worker.hpp`.

### 8.100.3 Member Function Documentation

**8.100.3.1** `atomic<bool>& uva::smt::bpbd::server::trans_task_pool_worker::is_busy ( )` `[inline]`

Returns the reference to the worker's `is_busy` flag

Returns

the worker's `is_busy` flag reference to see if the worker is busy or not.

Definition at line 79 of file `trans_task_pool_worker.hpp`.

**8.100.3.2** `void uva::smt::bpbd::server::trans_task_pool_worker::operator() ( )`

This operator will be called to run the thread, its implementation will run the tasks scheduled in the thread pool.

Definition at line 34 of file `trans_task_pool_worker.cpp`.

**8.100.3.3** `void uva::smt::bpbd::server::trans_task_pool_worker::stop ( )` `[inline]`

Forces the given worker to stop

Definition at line 71 of file `trans_task_pool_worker.hpp`.

The documentation for this class was generated from the following files:

- [inc/server/trans\\_task\\_pool\\_worker.hpp](#)
- [src/server/trans\\_task\\_pool\\_worker.cpp](#)

## 8.101 uva::smt::bpbd::client::translation\_client Class Reference

```
#include <translation_client.hpp>
```

## Public Types

- typedef websocketpp::client< websocketpp::config::asio\_client > [client](#)
- typedef function< void(const [trans\\_job\\_response\\_ptr](#) trans\_job\_resp) > [response\\_setter](#)
- typedef function< void() > [conn\\_close\\_notifier](#)

## Public Member Functions

- [translation\\_client](#) (const string &host, const uint16\_t port, [response\\_setter](#) set\_response, [conn\\_close\\_notifier](#) notify\_conn\_close)
- [~translation\\_client](#) ()
- bool [connect](#) ()
- void [disconnect](#) ()
- void [send](#) (const [trans\\_job\\_request\\_ptr](#) request)
- void [on\\_message](#) (websocketpp::connection\_hdl hdl, client::message\_ptr msg)
- void [on\\_open](#) (websocketpp::connection\_hdl hdl)
- void [on\\_close](#) (websocketpp::connection\_hdl hdl)
- void [on\\_fail](#) (websocketpp::connection\_hdl hdl)
- const string [get\\_uri](#) ()

## Protected Member Functions

- bool [wait\\_connect](#) ()

### 8.101.1 Detailed Description

This class is responsible for sending the translation job request to the server and receiving the result.

Definition at line 61 of file translation\_client.hpp.

### 8.101.2 Member Typedef Documentation

8.101.2.1 typedef websocketpp::client<websocketpp::config::asio\_client> **uva::smt::bpbd::client::translation\_client::client** ↩

Definition at line 63 of file translation\_client.hpp.

8.101.2.2 typedef function<void() > **uva::smt::bpbd::client::translation\_client::conn\_close\_notifier**

Definition at line 69 of file translation\_client.hpp.

8.101.2.3 typedef function<void(const [trans\\_job\\_response\\_ptr](#) trans\_job\_resp) > **uva::smt::bpbd::client::translation\_client::response\_setter** ↩

Definition at line 66 of file translation\_client.hpp.

### 8.101.3 Constructor & Destructor Documentation

8.101.3.1 **uva::smt::bpbd::client::translation\_client** ( const string & *host*, const uint16\_t *port*, [response\\_setter](#) *set\_response*, [conn\\_close\\_notifier](#) *notify\_conn\_close* ) [inline]

Definition at line 71 of file translation\_client.hpp.

**8.101.3.2** `uva::smt::bpbd::client::translation_client::~~translation_client ( ) [inline]`

The basic destructor that also stops the client

Definition at line 97 of file `translation_client.hpp`.

#### 8.101.4 Member Function Documentation

**8.101.4.1** `bool uva::smt::bpbd::client::translation_client::connect ( ) [inline]`

This method will block until the connection is complete

##### Parameters

|            |                       |
|------------|-----------------------|
| <i>uri</i> | the uri to connect to |
|------------|-----------------------|

##### Returns

true if the connection has been established

Definition at line 108 of file `translation_client.hpp`.

**8.101.4.2** `void uva::smt::bpbd::client::translation_client::disconnect ( ) [inline]`

Allows to close the connection and stop the io service thread

Definition at line 134 of file `translation_client.hpp`.

**8.101.4.3** `const string uva::smt::bpbd::client::translation_client::get_uri ( ) [inline]`

Allows to get the connection URI

##### Returns

the connection URI

Definition at line 252 of file `translation_client.hpp`.

**8.101.4.4** `void uva::smt::bpbd::client::translation_client::on_close ( websocketpp::connection_hdl hdl ) [inline]`

The close handler will signal that we should stop sending translation job(s)

##### Parameters

|            |                    |
|------------|--------------------|
| <i>the</i> | connection handler |
|------------|--------------------|

Definition at line 218 of file `translation_client.hpp`.

**8.101.4.5** `void uva::smt::bpbd::client::translation_client::on_fail ( websocketpp::connection_hdl hdl ) [inline]`

The fail handler will signal that we should stop sending translation job(s)

##### Parameters

|            |                    |
|------------|--------------------|
| <i>the</i> | connection handler |
|------------|--------------------|

Definition at line 235 of file translation\_client.hpp.

8.101.4.6 `void uva::smt::bpbd::client::translation_client::on_message ( websocketpp::connection_hdl hdl, client::message_ptr msg )` `[inline]`

This method is used to receive the job translation messages

Parameters

|            |                        |
|------------|------------------------|
| <i>hdl</i> | the connection handler |
| <i>msg</i> | the message            |

Definition at line 197 of file translation\_client.hpp.

8.101.4.7 `void uva::smt::bpbd::client::translation_client::on_open ( websocketpp::connection_hdl hdl )` `[inline]`

The open handler will signal that we are ready to start sending translation job(s)

Parameters

|            |                    |
|------------|--------------------|
| <i>the</i> | connection handler |
|------------|--------------------|

Definition at line 206 of file translation\_client.hpp.

8.101.4.8 `void uva::smt::bpbd::client::translation_client::send ( const trans_job_request_ptr request )` `[inline]`

Attempts to send the translation job request

Parameters

|                |                             |
|----------------|-----------------------------|
| <i>request</i> | the translation job request |
|----------------|-----------------------------|

Definition at line 173 of file translation\_client.hpp.

8.101.4.9 `bool uva::smt::bpbd::client::translation_client::wait_connect ( )` `[inline]`, `[protected]`

Allows to wait until the connection to the server is established.

Returns

true if the connection is successfully established

Definition at line 262 of file translation\_client.hpp.

The documentation for this class was generated from the following file:

- inc/client/[translation\\_client.hpp](#)

## 8.102 uva::smt::bpbd::server::translation\_server Class Reference

```
#include <translation_server.hpp>
```

### Public Types

- `typedef websocketpp::server< websocketpp::config::asio >` [server](#)

## Public Member Functions

- [translation\\_server](#) (const uint16\_t port, const size\_t num\_threads)
- void [set\\_num\\_threads](#) (const size\_t num\_threads)
- void [report\\_run\\_time\\_info](#) ()
- void [run](#) ()
- void [stop](#) ()

## Protected Member Functions

- void [send\\_response](#) (connection\_hdl hdl, [trans\\_job\\_response](#) &response)
- void [on\\_open](#) (connection\_hdl hdl)
- void [on\\_close](#) (connection\_hdl hdl)
- void [on\\_fail](#) (connection\_hdl hdl)
- void [on\\_message](#) (websocketpp::connection\_hdl hdl, server::message\_ptr msg)

### 8.102.1 Detailed Description

This is the translation server class implementing the functionality of receiving the client connections and doing translation jobs for them.

Definition at line 64 of file `translation_server.hpp`.

### 8.102.2 Member Typedef Documentation

8.102.2.1 `typedef websocketpp::server<websocketpp::config::asio> uva::smt::bpbd::server::translation_server↵  
::server`

Definition at line 66 of file `translation_server.hpp`.

### 8.102.3 Constructor & Destructor Documentation

8.102.3.1 `uva::smt::bpbd::server::translation_server ( const uint16_t port, const size_t num_threads )  
[inline]`

The basic constructor

Parameters

|                    |                                          |
|--------------------|------------------------------------------|
| <i>port</i>        | the port to listen to                    |
| <i>num_threads</i> | the number of translation threads to run |

Definition at line 73 of file `translation_server.hpp`.

### 8.102.4 Member Function Documentation

8.102.4.1 `void uva::smt::bpbd::server::translation_server::on_close ( connection_hdl hdl ) [inline], [protected]`

Removes the session object and also stops the processed translation job requests

Parameters



|            |                        |
|------------|------------------------|
| <i>hdl</i> | the connection handler |
|------------|------------------------|

Definition at line 196 of file translation\_server.hpp.

**8.102.4.2** void uva::smt::bpbd::server::translation\_server::on\_fail ( connection\_hdl *hdl* ) [inline], [protected]

Is called in case of a websocket error, for now does nothing but logs the error

Parameters

|            |                        |
|------------|------------------------|
| <i>hdl</i> | the connection handler |
|------------|------------------------|

Definition at line 207 of file translation\_server.hpp.

**8.102.4.3** void uva::smt::bpbd::server::translation\_server::on\_message ( websocketpp::connection\_hdl *hdl*, server::message\_ptr *msg* ) [inline], [protected]

Is called when the message is received by the server

Parameters

|            |                        |
|------------|------------------------|
| <i>hdl</i> | the connection handler |
| <i>msg</i> | the received message   |

Definition at line 216 of file translation\_server.hpp.

**8.102.4.4** void uva::smt::bpbd::server::translation\_server::on\_open ( connection\_hdl *hdl* ) [inline], [protected]

Creates a new session object for the new connection/client

Parameters

|            |  |
|------------|--|
| <i>hdl</i> |  |
|------------|--|

Definition at line 179 of file translation\_server.hpp.

**8.102.4.5** void uva::smt::bpbd::server::translation\_server::report\_run\_time\_info ( ) [inline]

Allows to report the runtime information about the server.

Definition at line 111 of file translation\_server.hpp.

**8.102.4.6** void uva::smt::bpbd::server::translation\_server::run ( ) [inline]

Allows to run the server

Definition at line 118 of file translation\_server.hpp.

**8.102.4.7** void uva::smt::bpbd::server::translation\_server::send\_response ( connection\_hdl *hdl*, trans\_job\_response & *response* ) [inline], [protected]

Allows to send the translation job response to the client associated with the given connection handler.

Parameters

|                 |                                                   |
|-----------------|---------------------------------------------------|
| <i>hdl</i>      | the connection handler to identify the connection |
| <i>response</i> | the translation response object to be used        |

Definition at line 156 of file translation\_server.hpp.

**8.102.4.8** `void uva::smt::bpbd::server::translation_server::set_num_threads ( const size_t num_threads ) [inline]`

Allows to set the new number of worker threads. This operation should be safe as the new threads are just added to the list and the deleted ones are let to finish their translation task execution.

Parameters

|                    |                                  |
|--------------------|----------------------------------|
| <i>num_threads</i> | the new number of worker threads |
|--------------------|----------------------------------|

Definition at line 104 of file translation\_server.hpp.

**8.102.4.9** `void uva::smt::bpbd::server::translation_server::stop ( ) [inline]`

Allows to stop the translation server

Definition at line 126 of file translation\_server.hpp.

The documentation for this class was generated from the following file:

- [inc/server/translation\\_server.hpp](#)

## 8.103 `uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >::TSubArr` Reference Struct Reference

```
#include <c2w_array_trie.hpp>
```

### Public Attributes

- [TShortId begin\\_idx](#)
- [TShortId end\\_idx](#)

### 8.103.1 Detailed Description

```
template<typename WordIndexType>struct uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >::TSubArrReference
```

This structure is needed to store begin and end index to reference pieces of an array It is used to reference sub-array ranges for the M-gram data for levels  $1 < M < N$ .

**WARNING:** It is not possible to get rid of this structure as the contexts are not ordered. It is only true that the contexts will be filled one after another, but the context id will not be increased all the time.

Parameters

|                 |                 |
|-----------------|-----------------|
| <i>beginIdx</i> | the begin index |
| <i>endIdx</i>   | the end index   |

Definition at line 418 of file c2w\_array\_trie.hpp.

### 8.103.2 Member Data Documentation

8.103.2.1 `template<typename WordIndexType > TShortId uva::smt::bpbd::server::lm::c2w_array_trie<WordIndexType >::TSubArrReference::begin_idx`

Definition at line 419 of file `c2w_array_trie.hpp`.

8.103.2.2 `template<typename WordIndexType > TShortId uva::smt::bpbd::server::lm::c2w_array_trie<WordIndexType >::TSubArrReference::end_idx`

Definition at line 420 of file `c2w_array_trie.hpp`.

The documentation for this struct was generated from the following file:

- [inc/server/lm/models/c2w\\_array\\_trie.hpp](#)

## 8.104 uva::smt::bpbd::server::lm::\_\_C2WArrayTrie::TWordIdPBDData Struct Reference

```
#include <c2w_array_trie.hpp>
```

### Public Attributes

- [TShortId id](#)
- [m\\_gram\\_payload payload](#)

### 8.104.1 Detailed Description

This structure stores two things the word id and the corresponding probability/back-off data. It is used to store the M-gram data for levels  $1 < M < N$ .

#### Parameters

|                |                                   |
|----------------|-----------------------------------|
| <i>id</i>      | the word id                       |
| <i>payload</i> | the back-off and probability data |

Definition at line 58 of file `c2w_array_trie.hpp`.

### 8.104.2 Member Data Documentation

8.104.2.1 `TShortId uva::smt::bpbd::server::lm::__C2WArrayTrie::TWordIdPBDData::id`

Definition at line 59 of file `c2w_array_trie.hpp`.

8.104.2.2 `m_gram_payload uva::smt::bpbd::server::lm::__C2WArrayTrie::TWordIdPBDData::payload`

Definition at line 60 of file `c2w_array_trie.hpp`.

The documentation for this struct was generated from the following file:

- [inc/server/lm/models/c2w\\_array\\_trie.hpp](#)

## 8.105 uva::smt::bpbd::server::lm::dictionary::\_\_counting\_word\_index::TWordInfo Struct Reference

```
#include <counting_word_index.hpp>
```

## Public Attributes

- string [word](#)
- [prob\\_weight](#) prob

### 8.105.1 Detailed Description

Definition at line 56 of file `counting_word_index.hpp`.

### 8.105.2 Member Data Documentation

#### 8.105.2.1 [prob\\_weight](#) `uva::smt::bpbd::server::lm::dictionary::__counting_word_index::TWordInfo::prob`

Definition at line 58 of file `counting_word_index.hpp`.

#### 8.105.2.2 `string` `uva::smt::bpbd::server::lm::dictionary::__counting_word_index::TWordInfo::word`

Definition at line 57 of file `counting_word_index.hpp`.

The documentation for this struct was generated from the following file:

- `inc/server/lm/dictionaries/counting\_word\_index.hpp`

## 8.106 `uva::utils::containers::upp_diag_matrix< element_type >` Class Template Reference

```
#include <upp_diag_matrix.hpp>
```

## Public Types

- typedef `element_type` \* [element\\_type\\_ptr](#)

## Public Member Functions

- [upp\\_diag\\_matrix](#) (`const size_t` dim)
- [~upp\\_diag\\_matrix](#) ()
- `const size_t` & [get\\_dim](#) () const
- `element_type` \* [operator\[\]](#) (`size_t` idx) const

## Public Attributes

- `const int32_t` [m\\_max\\_idx](#)

## Static Public Attributes

- static constexpr `int32_t` [m\\_min\\_idx](#) = 0

### 8.106.1 Detailed Description

```
template<typename element_type>class uva::utils::containers::upp_diag_matrix< element_type >
```

This class represents the square matrix that should save on memory when used with e.g. upper/low diagonal matrix rows. Note 1: This class is thread safe as long as you do not try to work with the same element from different threads. Note 2: This class assumes the proper acces to the matrix elements. I.e. matrix indexes are not checked, writing the the elements below the diagonal will also result in broken data.

Definition at line 56 of file upp\_diag\_matrix.hpp.

### 8.106.2 Member Typedef Documentation

8.106.2.1 `template<typename element_type> typedef element_type* uva::utils::containers::upp_diag_matrix< element_type >::element_type_ptr`

Definition at line 59 of file upp\_diag\_matrix.hpp.

### 8.106.3 Constructor & Destructor Documentation

8.106.3.1 `template<typename element_type> uva::utils::containers::upp_diag_matrix< element_type >::upp_diag_matrix( const size_t dim ) [inline]`

The basic constructor

Parameters

|                  |                                                                         |
|------------------|-------------------------------------------------------------------------|
| <i>dimension</i> | the dimension of the matrix, it will be a square upper diagonal matrix. |
|------------------|-------------------------------------------------------------------------|

Definition at line 71 of file upp\_diag\_matrix.hpp.

8.106.3.2 `template<typename element_type> uva::utils::containers::upp_diag_matrix< element_type >::~~upp_diag_matrix( ) [inline]`

The basic destructor

Definition at line 99 of file upp\_diag\_matrix.hpp.

### 8.106.4 Member Function Documentation

8.106.4.1 `template<typename element_type> const size_t& uva::utils::containers::upp_diag_matrix< element_type >::get_dim( ) const [inline]`

Allows to retrieve the reference to the dimension of this square matrix

Returns

the reference to the dimension of the square matrix

Definition at line 116 of file upp\_diag\_matrix.hpp.

8.106.4.2 `template<typename element_type> element_type* uva::utils::containers::upp_diag_matrix< element_type >::operator[]( size_t idx ) const [inline]`

Allows to access the matrix row with the given index

## Parameters

|            |               |
|------------|---------------|
| <i>idx</i> | the row index |
|------------|---------------|

## Returns

the pointer to the matrix row array

Definition at line 125 of file `upp_diag_matrix.hpp`.

## 8.106.5 Member Data Documentation

8.106.5.1 `template<typename element_type> const int32_t uva::utils::containers::upp_diag_matrix< element_type >::m_max_idx`

Definition at line 65 of file `upp_diag_matrix.hpp`.

8.106.5.2 `template<typename element_type> constexpr int32_t uva::utils::containers::upp_diag_matrix< element_type >::m_min_idx = 0 [static]`

Definition at line 62 of file `upp_diag_matrix.hpp`.

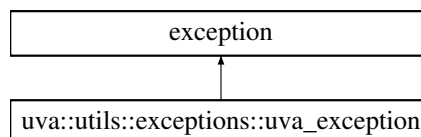
The documentation for this class was generated from the following file:

- [inc/common/utls/containers/upp\\_diag\\_matrix.hpp](#)

## 8.107 uva::utils::exceptions::uva\_exception Class Reference

```
#include <exceptions.hpp>
```

Inheritance diagram for `uva::utils::exceptions::uva_exception`:



## Public Member Functions

- [uva\\_exception](#) (const char \*message)
- [uva\\_exception](#) (const string &message)
- [uva\\_exception](#) (uva\_exception const &other)
- string const & [get\\_message](#) () const throw ()
- virtual [~uva\\_exception](#) () throw ()
- virtual const char \* [what](#) () const throw ()

## 8.107.1 Detailed Description

This is an application exception class that is capable of storing an error message

Definition at line 69 of file `exceptions.hpp`.

## 8.107.2 Constructor & Destructor Documentation

8.107.2.1 `uva::utils::exceptions::uva_exception ( const char * message )` `[inline]`, `[explicit]`

Definition at line 76 of file exceptions.hpp.

8.107.2.2 `uva::utils::exceptions::uva_exception ( const string & message )` `[inline]`, `[explicit]`

Definition at line 79 of file exceptions.hpp.

8.107.2.3 `uva::utils::exceptions::uva_exception ( uva_exception const & other )` `[inline]`

The copy constructor

Parameters

|              |                                  |
|--------------|----------------------------------|
| <i>other</i> | the other exception to copy from |
|--------------|----------------------------------|

Definition at line 86 of file exceptions.hpp.

8.107.2.4 `virtual uva::utils::exceptions::uva_exception::~uva_exception ( ) throw ( )` `[inline]`, `[virtual]`

Destructor. Virtual to allow for subclassing.

Definition at line 101 of file exceptions.hpp.

## 8.107.3 Member Function Documentation

8.107.3.1 `string const& uva::utils::exceptions::uva_exception::get_message ( ) const throw ( )` `[inline]`

This method returns the stored message

Returns

the reference to a constant error message string

Definition at line 94 of file exceptions.hpp.

8.107.3.2 `virtual const char* uva::utils::exceptions::uva_exception::what ( ) const throw ( )` `[inline]`, `[virtual]`

Returns a pointer to the (constant) error description.

Returns

A pointer to a `const char*`. The underlying memory is in posession of the `Exception` object. Callers *must* not attempt to free the memory.

Definition at line 109 of file exceptions.hpp.

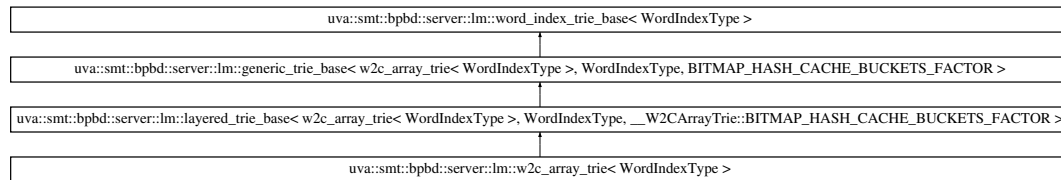
The documentation for this class was generated from the following file:

- inc/common/utls/[exceptions.hpp](#)

## 8.108 uva::smt::bpbdd::server::lm::w2c\_array\_trie< WordIndexType > Class Template Reference

```
#include <w2c_array_trie.hpp>
```

Inheritance diagram for uva::smt::bpbdd::server::lm::w2c\_array\_trie< WordIndexType >:



### Classes

- class [WordDataEntry](#)

### Public Types

- typedef [layered\\_trie\\_base](#)< [w2c\\_array\\_trie](#)< [WordIndexType](#) >, [WordIndexType](#), [\\_\\_W2CArrayTrie::BITMAP\\_HASH\\_CACHE\\_BUCKETS\\_FACTOR](#) > [BASE](#)

### Public Member Functions

- [w2c\\_array\\_trie](#) ([WordIndexType](#) &word\_index)
- float [get\\_unk\\_word\\_prob](#) () const
- bool [get\\_ctx\\_id](#) (const [phrase\\_length](#) level\_idx, const [TShortId](#) word\_id, [TLongId](#) &ctx\_id) const
- void [log\\_model\\_type\\_info](#) () const
- void [set\\_def\\_unk\\_word\\_prob](#) (const [prob\\_weight](#) prob)
- virtual void [pre\\_allocate](#) (const size\_t counts[LM\_M\_GRAM\_LEVEL\_MAX])
- template<phrase\_length CURR\_LEVEL>  
bool [is\\_post\\_grams](#) () const
- template<phrase\_length CURR\_LEVEL>  
void [post\\_grams](#) ()
- template<phrase\_length CURR\_LEVEL>  
void [add\\_m\\_gram](#) (const [model\\_m\\_gram](#) &gram)
- void [get\\_unigram\\_payload](#) ([m\\_gram\\_query](#) &query) const
- void [get\\_m\\_gram\\_payload](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const
- void [get\\_n\\_gram\\_payload](#) ([m\\_gram\\_query](#) &query, [MGramStatusEnum](#) &status) const
- virtual [~w2c\\_array\\_trie](#) ()

### Protected Types

- typedef [WordDataEntry](#)< [T\\_M\\_GramData](#) > [T\\_M\\_GramWordEntry](#)
- typedef [WordDataEntry](#)< [T\\_N\\_GramData](#) > [T\\_N\\_GramWordEntry](#)

### Protected Member Functions

- template<typename WORD\_ENTRY\_TYPE >  
void [post\\_M\\_N\\_Grams](#) (WORD\_ENTRY\_TYPE \*wordsArray)
- template<phrase\_length level>  
void [post\\_m\\_grams](#) ()
- void [post\\_n\\_grams](#) ()



## Additional Inherited Members

### 8.108.1 Detailed Description

```
template<typename WordIndexType>class uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >
```

This is the Context to word array memory trie implementation class.

#### Parameters

|                         |                                           |
|-------------------------|-------------------------------------------|
| <i>M_GRAM_LEVEL_MAX</i> | the maximum number of levels in the trie. |
|-------------------------|-------------------------------------------|

Definition at line 107 of file w2c\_array\_trie.hpp.

### 8.108.2 Member Typedef Documentation

```
8.108.2.1 template<typename WordIndexType > typedef layered_trie_base<w2c_array_trie<WordIndexType>, WordIndexType, _W2CArraryTrie::BITMAP_HASH_CACHE_BUCKETS_FACTOR>
uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::BASE
```

Definition at line 109 of file w2c\_array\_trie.hpp.

```
8.108.2.2 template<typename WordIndexType > typedef WordDataEntry<T_M_GramData>
uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::T_M_GramWordEntry
[protected]
```

Definition at line 382 of file w2c\_array\_trie.hpp.

```
8.108.2.3 template<typename WordIndexType > typedef WordDataEntry<T_N_GramData>
uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::T_N_GramWordEntry
[protected]
```

Definition at line 384 of file w2c\_array\_trie.hpp.

### 8.108.3 Constructor & Destructor Documentation

```
8.108.3.1 template<typename WordIndexType > uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType
>::w2c_array_trie (WordIndexType & word_index) [explicit]
```

The basic constructor

#### Parameters

|                     |                                       |
|---------------------|---------------------------------------|
| <i>p_word_index</i> | the word index (dictionary) container |
|---------------------|---------------------------------------|

Definition at line 48 of file w2c\_array\_trie.cpp.

```
8.108.3.2 template<typename WordIndexType > uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType
>::~~w2c_array_trie () [virtual]
```

The basic destructor

Definition at line 89 of file w2c\_array\_trie.cpp.

### 8.108.4 Member Function Documentation

8.108.4.1 `template<typename WordIndexType > template<phrase_length CURR_LEVEL> void uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::add_m_gram ( const model_m_gram & gram )`  
`[inline]`

Allows to retrieve the data storage structure for the M gram with the given M-gram level Id. M-gram context and last word Id. If the storage structure does not exist, return a new one. For more details

See also

LayeredTrieBase

Definition at line 241 of file w2c\_array\_trie.hpp.

8.108.4.2 `template<typename WordIndexType > bool uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::get_ctx_id ( const phrase_length level_idx, const TShortId word_id, TLongId & ctx_id )`  
`const [inline]`

Computes the M-Gram context using the previous context and the current word id

See also

LayeredTrieBase

Definition at line 129 of file w2c\_array\_trie.hpp.

8.108.4.3 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::get_m_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const`  
`[inline]`

Allows to retrieve the payload for the M-gram defined by the end word\_id and ctx\_id. For more details

See also

LayeredTrieBase

Definition at line 294 of file w2c\_array\_trie.hpp.

8.108.4.4 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::get_n_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const`  
`[inline]`

Allows to attempt the sub-m-gram payload retrieval for m==n

See also

GenericTrieBase

Definition at line 330 of file w2c\_array\_trie.hpp.

8.108.4.5 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::get_unigram_payload ( m_gram_query & query ) const` `[inline]`

Allows to attempt the sub-m-gram payload retrieval for m==1. The retrieval of a uni-gram data is always a success

See also

`GenericTrieBase`

Definition at line 279 of file `w2c_array_trie.hpp`.

8.108.4.6 `template<typename WordIndexType > float uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::get_unk_word_prob ( ) const [inline]`

Allows to retrieve the unknown target word log probability penalty

Returns

the target source word log probability penalty

Definition at line 121 of file `w2c_array_trie.hpp`.

8.108.4.7 `template<typename WordIndexType > template<phrase_length CURR_LEVEL> bool uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::is_post_grams ( ) const [inline]`

This method allows to check if post processing should be called after all the X level grams are read. This method is virtual. For more details

See also

`WordIndexTrieBase`

Definition at line 204 of file `w2c_array_trie.hpp`.

8.108.4.8 `template<typename WordIndexType > void uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::log_model_type_info ( ) const [inline]`

Allows to log the information about the instantiated trie type

Definition at line 180 of file `w2c_array_trie.hpp`.

8.108.4.9 `template<typename WordIndexType > template<phrase_length CURR_LEVEL> void uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::post_grams ( ) [inline]`

This method should be called after all the X level grams are read. For more details

See also

`WordIndexTrieBase`

Definition at line 218 of file `w2c_array_trie.hpp`.

8.108.4.10 `template<typename WordIndexType > template<phrase_length level> void uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::post_m_grams ( ) [inline], [protected]`

Definition at line 421 of file `w2c_array_trie.hpp`.

```
8.108.4.11 template<typename WordIndexType > template<typename WORD_ENTRY_TYPE > void
 uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::post_M_N_Grams (
 WORD_ENTRY_TYPE * wordsArray) [inline],[protected]
```

The purpose of this local function is three fold:

1. First we compute the context index offset values.
2. Second we re-order the context data arrays per word.
3. Free the unneeded memory allocated earlier.

Parameters

|                        |                             |
|------------------------|-----------------------------|
| <i>WORD_ENTRY_TYPE</i> | word array element type     |
| <i>wordsArray</i>      | the word array to work with |

Definition at line 395 of file w2c\_array\_trie.hpp.

```
8.108.4.12 template<typename WordIndexType > void uva::smt::bpbd::server::lm::w2c_array_trie<
 WordIndexType >::post_n_grams () [inline],[protected]
```

Definition at line 426 of file w2c\_array\_trie.hpp.

```
8.108.4.13 template<typename WordIndexType > void uva::smt::bpbd::server::lm::w2c_array_trie<
 WordIndexType >::pre_allocate (const size_t counts[LM_M_GRAM_LEVEL_MAX]) [virtual]
```

This method can be used to provide the N-gram count information That should allow for pre-allocation of the memory  
For more details

See also

[LayeredTrieBase](#)

Definition at line 61 of file w2c\_array\_trie.cpp.

```
8.108.4.14 template<typename WordIndexType > void uva::smt::bpbd::server::lm::w2c_array_trie<
 WordIndexType >::set_def_unk_word_prob (const prob_weight prob)
```

See also

[word\\_index\\_trie\\_base](#)

Definition at line 81 of file w2c\_array\_trie.cpp.

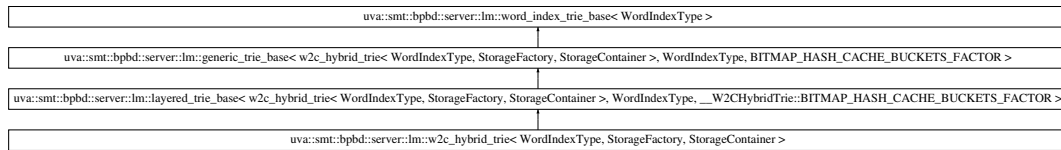
The documentation for this class was generated from the following files:

- [inc/server/lm/models/w2c\\_array\\_trie.hpp](#)
- [src/server/lm/models/w2c\\_array\\_trie.cpp](#)

**8.109 uva::smt::bpbd::server::lm::w2c\_hybrid\_trie< WordIndexType, StorageFactory, StorageContainer > Class Template Reference**

```
#include <w2c_hybrid_trie.hpp>
```

Inheritance diagram for `uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer >`:



## Public Types

- typedef `layered_trie_base< w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer >, WordIndexType, __W2CHybridTrie::BITMAP_HASH_CACHE_BUCKETS_FACTOR > BASE`

## Public Member Functions

- `w2c_hybrid_trie (WordIndexType &word_index)`
- float `get_unk_word_prob ()` const
- bool `get_ctx_id (const phrase_length level_idx, const TShortId word_id, TLongId &ctx_id)` const
- void `log_model_type_info ()` const
- void `set_def_unk_word_prob (const prob_weight prob)`
- virtual void `pre_allocate (const size_t counts[LM_M_GRAM_LEVEL_MAX])`
- template<phrase\_length CURR\_LEVEL>  
void `add_m_gram (const model_m_gram &gram)`
- void `get_unigram_payload (m_gram_query &query)` const
- void `get_m_gram_payload (m_gram_query &query, MGramStatusEnum &status)` const
- void `get_n_gram_payload (m_gram_query &query, MGramStatusEnum &status)` const
- virtual `~w2c_hybrid_trie ()`

## Additional Inherited Members

### 8.109.1 Detailed Description

template<typename WordIndexType, template< phrase\_length > class StorageFactory = W2CH\_UM\_StorageFactory, class StorageContainer = W2CH\_UM\_Storage>class `uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer >`

This is the hybrid memory trie implementation class. It has three template parameters.

#### Parameters

|                               |                                                           |
|-------------------------------|-----------------------------------------------------------|
| <code>M_GRAM_LEVEL_MAX</code> | the maximum number of levels in the trie.                 |
| <code>StorageFactory</code>   | the factory to create storage containers                  |
| <code>StorageContainer</code> | the storage container type that is created by the factory |

Definition at line 56 of file `w2c_hybrid_trie.hpp`.

### 8.109.2 Member Typedef Documentation

```

8.109.2.1 template<typename WordIndexType , template< phrase_length > class StorageFactory
 = W2CH_UM_StorageFactory, class StorageContainer = W2CH_UM_Storage> typedef
 layered_trie_base<w2c_hybrid_trie<WordIndexType, StorageFactory, StorageContainer>,
 WordIndexType, __W2CHybridTrie::BITMAP_HASH_CACHE_BUCKETS_FACTOR> uva::smt↵
 ::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer
 >::BASE

```

Definition at line 58 of file w2c\_hybrid\_trie.hpp.

### 8.109.3 Constructor & Destructor Documentation

```

8.109.3.1 template<typename WordIndexType , template< phrase_length > class StorageFactory, class StorageContainer
 > uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer
 >::w2c_hybrid_trie (WordIndexType & word_index) [explicit]

```

The basic constructor

Parameters

|                     |                                       |
|---------------------|---------------------------------------|
| <i>p_word_index</i> | the word index (dictionary) container |
|---------------------|---------------------------------------|

Definition at line 47 of file w2c\_hybrid\_trie.cpp.

```

8.109.3.2 template<typename WordIndexType , template< phrase_length > class StorageFactory, class StorageContainer
 > uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer
 >::~w2c_hybrid_trie () [virtual]

```

The basic destructor

Definition at line 116 of file w2c\_hybrid\_trie.cpp.

### 8.109.4 Member Function Documentation

```

8.109.4.1 template<typename WordIndexType , template< phrase_length > class StorageFactory = W2CH_UM_StorageFactory,
 class StorageContainer = W2CH_UM_Storage> template<phrase_length CURR_LEVEL> void
 uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer
 >::add_m_gram (const model_m_gram & gram) [inline]

```

Allows to retrieve the data storage structure for the M gram with the given M-gram level Id. M-gram context and last word Id. If the storage structure does not exist, return a new one. For more details

See also

LayeredTrieBase

Definition at line 135 of file w2c\_hybrid\_trie.hpp.

```

8.109.4.2 template<typename WordIndexType , template< phrase_length > class StorageFactory = W2CH_UM_StorageFactory,
 class StorageContainer = W2CH_UM_Storage> bool uva::smt::bpbd::server::lm::w2c_hybrid_trie<
 WordIndexType, StorageFactory, StorageContainer >::get_ctx_id (const phrase_length level_idx, const
 TShortId word_id, TLongId & ctx_id) const [inline]

```

Computes the M-Gram context using the previous context and the current word id

See also

LayeredTrieBase

Definition at line 78 of file w2c\_hybrid\_trie.hpp.

8.109.4.3 `template<typename WordIndexType , template< phrase_length > class StorageFactory = W2CH_UM_StorageFactory, class StorageContainer = W2CH_UM_Storage> void uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer >::get_m_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to retrieve the payload for the M-gram defined by the end word\_id and ctx\_id. For more details

See also

LayeredTrieBase

Definition at line 203 of file w2c\_hybrid\_trie.hpp.

8.109.4.4 `template<typename WordIndexType , template< phrase_length > class StorageFactory = W2CH_UM_StorageFactory, class StorageContainer = W2CH_UM_Storage> void uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer >::get_n_gram_payload ( m_gram_query & query, MGramStatusEnum & status ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for m==n

See also

GenericTrieBase

Definition at line 241 of file w2c\_hybrid\_trie.hpp.

8.109.4.5 `template<typename WordIndexType , template< phrase_length > class StorageFactory = W2CH_UM_StorageFactory, class StorageContainer = W2CH_UM_Storage> void uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer >::get_unigram_payload ( m_gram_query & query ) const [inline]`

Allows to attempt the sub-m-gram payload retrieval for m==1. The retrieval of a uni-gram data is always a success

See also

GenericTrieBase

Definition at line 188 of file w2c\_hybrid\_trie.hpp.

8.109.4.6 `template<typename WordIndexType , template< phrase_length > class StorageFactory = W2CH_UM_StorageFactory, class StorageContainer = W2CH_UM_Storage> float uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer >::get_unk_word_prob ( ) const [inline]`

Allows to retrieve the unknown target word log probability penalty

Returns

the target source word log probability penalty

Definition at line 70 of file w2c\_hybrid\_trie.hpp.

```
8.109.4.7 template<typename WordIndexType , template< phrase_length > class StorageFactory = W2CH_UM_StorageFactory,
class StorageContainer = W2CH_UM_Storage> void uva::smt::bpbd::server::lm::w2c_hybrid_trie<
WordIndexType, StorageFactory, StorageContainer >::log_model_type_info () const [inline]
```

Allows to log the information about the instantiated trie type

Definition at line 112 of file w2c\_hybrid\_trie.hpp.

```
8.109.4.8 template<typename WordIndexType , template< phrase_length > class StorageFactory, class StorageContainer >
void uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer
>::pre_allocate (const size_t counts[LM_M_GRAM_LEVEL_MAX]) [virtual]
```

This method can be used to provide the N-gram count information That should allow for pre-allocation of the memory  
For more details

See also

[LayeredTrieBase](#)

Definition at line 72 of file w2c\_hybrid\_trie.cpp.

```
8.109.4.9 template<typename WordIndexType , template< phrase_length > class StorageFactory, class StorageContainer >
void uva::smt::bpbd::server::lm::w2c_hybrid_trie< WordIndexType, StorageFactory, StorageContainer
>::set_def_unk_word_prob (const prob_weight prob)
```

See also

[word\\_index\\_trie\\_base](#)

Definition at line 107 of file w2c\_hybrid\_trie.cpp.

The documentation for this class was generated from the following files:

- [inc/server/lm/models/w2c\\_hybrid\\_trie.hpp](#)
- [src/server/lm/models/w2c\\_hybrid\\_trie.cpp](#)

## 8.110 uva::smt::bpbd::server::lm::W2CH\_UM\_Storage Class Reference

```
#include <w2ch_um_storage.hpp>
```

### Public Types

- typedef TStorageUnsignedMap::const\_iterator [const\\_iterator](#)

### Public Member Functions

- [W2CH\\_UM\\_Storage](#) (TStorageMapAllocator &alloc)
- virtual [~W2CH\\_UM\\_Storage](#) ()
- TShortId & [operator\[\]](#) (const TShortId ctx\_idx)
- const TShortId & [at](#) (const TShortId ctx\_idx) const throw (out\_of\_range)
- [const\\_iterator](#) [find](#) (const TShortId ctx\_idx)
- [const\\_iterator](#) [end](#) ()



### 8.110.1 Detailed Description

The unordered hash map-based storage for the HybridMemoryTrie

Definition at line 61 of file w2ch\_um\_storage.hpp.

### 8.110.2 Member Typedef Documentation

8.110.2.1 `typedef TStorageUnsignedMap::const_iterator uva::smt::bpbd::server::lm::W2CH_UM_Storage::const_iterator`

Definition at line 64 of file w2ch\_um\_storage.hpp.

### 8.110.3 Constructor & Destructor Documentation

8.110.3.1 `uva::smt::bpbd::server::lm::W2CH_UM_Storage::W2CH_UM_Storage ( TStorageMapAllocator & alloc )`  
[inline]

Definition at line 66 of file w2ch\_um\_storage.hpp.

8.110.3.2 `virtual uva::smt::bpbd::server::lm::W2CH_UM_Storage::~~W2CH_UM_Storage ( )` [inline], [virtual]

Definition at line 70 of file w2ch\_um\_storage.hpp.

### 8.110.4 Member Function Documentation

8.110.4.1 `const TShortId& uva::smt::bpbd::server::lm::W2CH_UM_Storage::at ( const TShortId ctx_idx ) const` throw out\_of\_range) [inline]

Definition at line 78 of file w2ch\_um\_storage.hpp.

8.110.4.2 `const_iterator uva::smt::bpbd::server::lm::W2CH_UM_Storage::end ( )` [inline]

Definition at line 86 of file w2ch\_um\_storage.hpp.

8.110.4.3 `const_iterator uva::smt::bpbd::server::lm::W2CH_UM_Storage::find ( const TShortId ctx_idx )` [inline]

Definition at line 82 of file w2ch\_um\_storage.hpp.

8.110.4.4 `TShortId& uva::smt::bpbd::server::lm::W2CH_UM_Storage::operator[] ( const TShortId ctx_idx )` [inline]

Definition at line 74 of file w2ch\_um\_storage.hpp.

The documentation for this class was generated from the following file:

- inc/server/lm/models/w2ch\_um\_storage.hpp

## 8.111 uva::smt::bpbd::server::lm::W2CH\_UM\_StorageFactory< N > Class Template Reference

```
#include <w2ch_um_storage.hpp>
```

## Public Member Functions

- [W2CH\\_UM\\_StorageFactory](#) (const size\_t \_counts[N], const float factor=\_\_W2CHybridTrie::UM\_CTX\_TO\_PB\_MAP\_STORE\_MEMORY\_FACTOR)
- virtual [~W2CH\\_UM\\_StorageFactory](#) ()
- [W2CH\\_UM\\_Storage](#) \* [create](#) (const phrase\_length level)

## Protected Attributes

- [TStorageMapAllocator](#) \* [m\\_p\\_alloc](#) [N-1]

### 8.111.1 Detailed Description

```
template<phrase_length N>class uva::smt::bpbd::server::lm::W2CH_UM_StorageFactory< N >
```

This is a factory class that should be used to produce containers of CtxToPBMapStorage.

Definition at line 99 of file w2ch\_um\_storage.hpp.

### 8.111.2 Constructor & Destructor Documentation

```
8.111.2.1 template<phrase_length N> uva::smt::bpbd::server::lm::W2CH_UM_StorageFactory<
N >::W2CH_UM_StorageFactory (const size_t _counts[N], const float factor =
__W2CHybridTrie::UM_CTX_TO_PB_MAP_STORE_MEMORY_FACTOR) [inline]
```

This is a basic constructor for the factory

Parameters

|                |                                                                                                               |
|----------------|---------------------------------------------------------------------------------------------------------------|
| <i>_counts</i> | the number of elements to insert per trie level                                                               |
| <i>factor</i>  | the memory multiplication factor, by default __CtxToPBMapStorageFactory::UM_CTX_TO_PB_MAP_STORE_MEMORY_FACTOR |

Definition at line 108 of file w2ch\_um\_storage.hpp.

```
8.111.2.2 template<phrase_length N> virtual uva::smt::bpbd::server::lm::W2CH_UM_StorageFactory< N
>::~W2CH_UM_StorageFactory () [inline],[virtual]
```

The basic destructor

Definition at line 122 of file w2ch\_um\_storage.hpp.

### 8.111.3 Member Function Documentation

```
8.111.3.1 template<phrase_length N> W2CH_UM_Storage* uva::smt::bpbd::server<
::lm::W2CH_UM_StorageFactory< N >::create (const phrase_length level)
[inline]
```

Allocates a new storage container for the given M-gram level

Parameters

|              |                                       |
|--------------|---------------------------------------|
| <i>level</i> | the N-gram level must be > 1 and <= N |
|--------------|---------------------------------------|

#### Returns

the pointer to the allocated container

Definition at line 133 of file `w2ch_um_storage.hpp`.

### 8.111.4 Member Data Documentation

8.111.4.1 `template<phrase_length N> TStorageMapAllocator* uva::smt::bpbd::server::lm::W2CH_UM_StorageFactory< N >::m_p_alloc[N-1]` [protected]

Definition at line 144 of file `w2ch_um_storage.hpp`.

The documentation for this class was generated from the following file:

- `inc/server/lm/models/w2ch_um_storage.hpp`

## 8.112 `uva::smt::bpbd::server::lm::dictionary::__optimizing_word_index::word_index_bucket_entry< word_id_type >` Struct Template Reference

```
#include <optimizing_word_index.hpp>
```

### Public Member Functions

- `word_index_bucket_entry()`

### Public Attributes

- `char * m_word`
- `uint8_t m_len`
- `word_id_type m_word_id`

### 8.112.1 Detailed Description

```
template<typename word_id_type> struct uva::smt::bpbd::server::lm::dictionary::__optimizing_word_index_bucket_entry< word_id_type >
```

This structure is to store the word index data, the word itself and its index

Definition at line 65 of file `optimizing_word_index.hpp`.

### 8.112.2 Constructor & Destructor Documentation

8.112.2.1 `template<typename word_id_type > uva::smt::bpbd::server::lm::dictionary::__optimizing_word_index::word_index_bucket_entry< word_id_type >::word_index_bucket_entry()` [inline]

Definition at line 67 of file `optimizing_word_index.hpp`.

### 8.112.3 Member Data Documentation

8.112.3.1 `template<typename word_id_type > uint8_t uva::smt::bpbd::server::lm::dictionary::__optimizing_↔  
word_index::word_index_bucket_entry< word_id_type >::m_len`

Definition at line 70 of file `optimizing_word_index.hpp`.

8.112.3.2 `template<typename word_id_type > char* uva::smt::bpbd::server::lm::dictionary::__optimizing_↔  
word_index::word_index_bucket_entry< word_id_type >::m_word`

Definition at line 69 of file `optimizing_word_index.hpp`.

8.112.3.3 `template<typename word_id_type > word_id_type uva::smt::bpbd::server::lm↔  
::dictionary::__optimizing_word_index::word_index_bucket_entry< word_id_type  
>::m_word_id`

Definition at line 71 of file `optimizing_word_index.hpp`.

The documentation for this struct was generated from the following file:

- `inc/server/lm/dictionaries/optimizing_word_index.hpp`

## 8.113 uva::smt::bpbd::server::lm::word\_index\_trie\_base< WordIndex > Class Template Reference

```
#include <word_index_trie_base.hpp>
```

### Public Types

- typedef WordIndex [WordIndexType](#)

### Public Member Functions

- [word\\_index\\_trie\\_base](#) ([WordIndexType](#) &word\_index)
- void [pre\\_allocate](#) (const size\_t counts[LM\_M\_GRAM\_LEVEL\_MAX])
- template<phrase\_length level>  
bool [is\\_post\\_grams](#) () const
- template<phrase\_length level>  
void [post\\_grams](#) ()
- void [set\\_def\\_unk\\_word\\_prob](#) (const [prob\\_weight](#) prob)
- [WordIndexType](#) & [get\\_word\\_index](#) () const

### Protected Attributes

- [WordIndexType](#) & [m\\_word\\_index](#)

### 8.113.1 Detailed Description

```
template<typename WordIndex>class uva::smt::bpbd::server::lm::word_index_trie_base< WordIndex >
```

This is a common base class for all Trie implementations. The purpose of having this as a template class is performance optimization.

Definition at line 59 of file word\_index\_trie\_base.hpp.

### 8.113.2 Member Typedef Documentation

8.113.2.1 `template<typename WordIndex> typedef WordIndex uva::smt::bpbd::server::lm::word_index_trie_base< WordIndex >::WordIndexType`

Definition at line 61 of file word\_index\_trie\_base.hpp.

### 8.113.3 Constructor & Destructor Documentation

8.113.3.1 `template<typename WordIndex> uva::smt::bpbd::server::lm::word_index_trie_base< WordIndex >::word_index_trie_base( WordIndexType & word_index ) [inline],[explicit]`

The basic constructor

Parameters

|                   |                           |
|-------------------|---------------------------|
| <i>word_index</i> | the word index to be used |
|-------------------|---------------------------|

Definition at line 67 of file word\_index\_trie\_base.hpp.

### 8.113.4 Member Function Documentation

8.113.4.1 `template<typename WordIndex> WordIndexType& uva::smt::bpbd::server::lm::word_index_trie_base< WordIndex >::get_word_index( ) const [inline]`

Allows to retrieve the stored word index, if any

Returns

the pointer to the stored word index or NULL if none

Definition at line 112 of file word\_index\_trie\_base.hpp.

8.113.4.2 `template<typename WordIndex> template<phrase_length level> bool uva::smt::bpbd::server::lm::word_index_trie_base< WordIndex >::is_post_grams( ) const [inline]`

This method allows to check if post processing should be called after all the X level grams are read. This method is virtual.

Parameters

|              |                                                        |
|--------------|--------------------------------------------------------|
| <i>level</i> | the level of the X-grams that were finished to be read |
|--------------|--------------------------------------------------------|

Definition at line 87 of file word\_index\_trie\_base.hpp.

8.113.4.3 `template<typename WordIndex> template<phrase_length level> void uva::smt::bpbd::server::lm::word_index_trie_base< WordIndex >::post_grams( ) [inline]`

This method should be called after all the X level grams are read.

## Parameters

|              |                                                        |
|--------------|--------------------------------------------------------|
| <i>level</i> | the level of the X-grams that were finished to be read |
|--------------|--------------------------------------------------------|

Definition at line 96 of file word\_index\_trie\_base.hpp.

**8.113.4.4** `template<typename WordIndex> void uva::smt::bpbdd::server::lm::word_index_trie_base< WordIndex >::pre_allocate ( const size_t counts[LM_M_GRAM_LEVEL_MAX] ) [inline]`

This method can be used to provide the N-gram count information That should allow for pre-allocation of the memory

## Parameters

|               |                                                    |
|---------------|----------------------------------------------------|
| <i>counts</i> | the array of N-Gram counts counts[0] is for 1-Gram |
|---------------|----------------------------------------------------|

Definition at line 76 of file word\_index\_trie\_base.hpp.

**8.113.4.5** `template<typename WordIndex> void uva::smt::bpbdd::server::lm::word_index_trie_base< WordIndex >::set_def_unk_word_prob ( const prob_weight prob ) [inline]`

Allows to set the default UNK word probability value, the back-off is set to zero

## Parameters

|             |                                        |
|-------------|----------------------------------------|
| <i>prob</i> | the unk word default probability value |
|-------------|----------------------------------------|

Definition at line 104 of file word\_index\_trie\_base.hpp.

## 8.113.5 Member Data Documentation

**8.113.5.1** `template<typename WordIndex> WordIndexType& uva::smt::bpbdd::server::lm::word_index_trie_base< WordIndex >::m_word_index [protected]`

Definition at line 114 of file word\_index\_trie\_base.hpp.

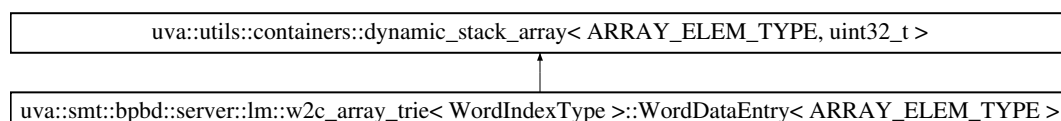
The documentation for this class was generated from the following file:

- inc/server/lm/models/[word\\_index\\_trie\\_base.hpp](#)

## 8.114 uva::smt::bpbdd::server::lm::w2c\_array\_trie< WordIndexType >::WordDataEntry< ARRAY\_ELEM\_TYPE > Class Template Reference

```
#include <w2c_array_trie.hpp>
```

Inheritance diagram for uva::smt::bpbdd::server::lm::w2c\_array\_trie< WordIndexType >::WordDataEntry< ARRAY\_ELEM\_TYPE >:



## Public Attributes

- [TShortId cio](#)

## Additional Inherited Members

### 8.114.1 Detailed Description

```
template<typename WordIndexType>template<typename ARRAY_ELEM_TYPE>class uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::WordDataEntry< ARRAY_ELEM_TYPE >
```

This class is to store the word mapping to the data for the  $1 < M \leq N$  grams. Demending on whether  $M == N$  or not this structure is to be instantiated with a different template parameter - defines the stored data.

#### Parameters

|                 |                                                                |
|-----------------|----------------------------------------------------------------|
| <i>ptr</i>      | the pointer to the storage array                               |
| <i>capacity</i> | the number of allocated elements                               |
| <i>size</i>     | the number of used elements                                    |
| <i>cio</i>      | the context index offset for computing the next context index. |

Definition at line 376 of file w2c\_array\_trie.hpp.

### 8.114.2 Member Data Documentation

8.114.2.1 `template<typename WordIndexType > template<typename ARRAY_ELEM_TYPE > TShortId uva::smt::bpbd::server::lm::w2c_array_trie< WordIndexType >::WordDataEntry< ARRAY_ELEM_TYPE >::cio`

Definition at line 378 of file w2c\_array\_trie.hpp.

The documentation for this class was generated from the following file:

- [inc/server/lm/models/w2c\\_array\\_trie.hpp](#)





## Chapter 9

# File Documentation

### 9.1 inc/client/client\_config.hpp File Reference

#### Classes

- struct [uva::smt::bpbd::client::client\\_config](#)

#### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::client](#)

### 9.2 inc/client/trans\_job.hpp File Reference

```
#include "trans_job_status.hpp"
#include "common/utils/exceptions.hpp"
#include "common/messaging/trans_job_request.hpp"
#include "common/messaging/trans_job_response.hpp"
```

#### Classes

- struct [uva::smt::bpbd::client::trans\\_job](#)

#### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::client](#)

#### Typedefs

- typedef trans\_job \* [uva::smt::bpbd::client::trans\\_job\\_ptr](#)

### 9.3 inc/server/trans\_job.hpp File Reference

```
#include <string>
#include <vector>
#include "trans_task.hpp"
#include "common/utils/threads.hpp"
#include "common/messaging/id_manager.hpp"
#include "common/messaging/trans_session_id.hpp"
#include "common/messaging/trans_job_request.hpp"
#include "common/messaging/trans_job_id.hpp"
#include "common/messaging/trans_job_code.hpp"
```

#### Classes

- class [uva::smt::bpbd::server::trans\\_job](#)

#### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

#### Typedefs

- typedef trans\_job \* [uva::smt::bpbd::server::trans\\_job\\_ptr](#)

### 9.4 inc/client/trans\_job\_status.hpp File Reference

```
#include <string>
#include <iostream>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
```

#### Classes

- class [uva::smt::bpbd::client::trans\\_job\\_status](#)

#### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::client](#)

#### Functions

- ostream & [uva::smt::bpbd::client::operator<<](#) (ostream &os, const trans\_job\_status &status)

## 9.5 inc/client/trans\_manager.hpp File Reference

```
#include <string>
#include <vector>
#include <unordered_map>
#include <cstdlib>
#include <chrono>
#include <iostream>
#include <fstream>
#include "client_config.hpp"
#include "translation_client.hpp"
#include "trans_job.hpp"
#include "trans_job_status.hpp"
#include "common/messaging/trans_job_code.hpp"
#include "common/messaging/id_manager.hpp"
#include "common/messaging/trans_job_id.hpp"
#include "common/messaging/trans_job_request.hpp"
#include "common/messaging/trans_job_response.hpp"
#include "common/utils/file/cstyle_file_reader.hpp"
#include "common/utils/threads.hpp"
#include "common/utils/string_utils.hpp"
```

### Classes

- class [uva::smt::bpbd::client::trans\\_manager](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::client](#)

## 9.6 inc/server/trans\_manager.hpp File Reference

```
#include <map>
#include <websocketpp/server.hpp>
#include "common/utils/threads.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/messaging/trans_job_request.hpp"
#include "common/messaging/id_manager.hpp"
#include "common/messaging/trans_session_id.hpp"
#include "common/messaging/trans_job_id.hpp"
#include "trans_job_pool.hpp"
#include "trans_job.hpp"
```

### Classes

- class [uva::smt::bpbd::server::trans\\_manager](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbdb](#)
- [uva::smt::bpbdb::server](#)

## 9.7 inc/client/translation\_client.hpp File Reference

```
#include <cstdlib>
#include <string>
#include <unordered_map>
#include <websocketpp/config/asio_no_tls_client.hpp>
#include <websocketpp/client.hpp>
#include "common/utis/threads.hpp"
#include "common/utis/exceptions.hpp"
#include "common/utis/logging/logger.hpp"
#include "common/messaging/trans_job_response.hpp"
#include "common/messaging/trans_job_request.hpp"
```

## Classes

- class [uva::smt::bpbdb::client::translation\\_client](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbdb](#)
- [uva::smt::bpbdb::client](#)

## Macros

- `#define` [ASIO\\_STANDALONE](#)

### 9.7.1 Macro Definition Documentation

#### 9.7.1.1 `#define` ASIO\_STANDALONE

Definition at line 33 of file translation\_client.hpp.

## 9.8 inc/common/messaging/id\_manager.hpp File Reference

```
#include <websocketpp/common/thread.hpp>
```

## Classes

- class [uva::smt::bpbdb::common::messaging::id\\_manager< id\\_type >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::common](#)
- [uva::smt::bpbd::common::messaging](#)

## 9.9 inc/common/messaging/trans\_job\_code.hpp File Reference

```
#include <string>
#include <iostream>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
```

## Classes

- class [uva::smt::bpbd::common::messaging::trans\\_job\\_code](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::common](#)
- [uva::smt::bpbd::common::messaging](#)

## Functions

- ostream & [uva::smt::bpbd::common::messaging::operator<<](#) (ostream &os, const trans\_job\_code &code)

## 9.10 inc/common/messaging/trans\_job\_id.hpp File Reference

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::common](#)
- [uva::smt::bpbd::common::messaging](#)
- [uva::smt::bpbd::common::messaging::job\\_id](#)

## Typedefs

- typedef uint64\_t [uva::smt::bpbd::common::messaging::job\\_id\\_type](#)

## 9.11 inc/common/messaging/trans\_job\_request.hpp File Reference

```
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/messaging/trans_session_id.hpp"
#include "common/messaging/trans_job_id.hpp"
```

### Classes

- class [uva::smt::bpbd::common::messaging::trans\\_job\\_request](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::common](#)
- [uva::smt::bpbd::common::messaging](#)

### Typedefs

- typedef trans\_job\_request \* [uva::smt::bpbd::common::messaging::trans\\_job\\_request\\_ptr](#)

## 9.12 inc/common/messaging/trans\_job\_response.hpp File Reference

```
#include <string>
#include <sstream>
#include <iostream>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/messaging/trans_job_id.hpp"
#include "common/messaging/trans_job_request.hpp"
#include "common/messaging/trans_job_code.hpp"
```

### Classes

- class [uva::smt::bpbd::common::messaging::trans\\_job\\_response](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::common](#)
- [uva::smt::bpbd::common::messaging](#)

## Typedefs

- typedef [trans\\_job\\_response](#) \* [uva::smt::bpbd::common::messaging::trans\\_job\\_response\\_ptr](#)

## 9.13 inc/common/messaging/trans\_session\_id.hpp File Reference

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::common](#)
- [uva::smt::bpbd::common::messaging](#)
- [uva::smt::bpbd::common::messaging::session\\_id](#)

## Typedefs

- typedef uint64\_t [uva::smt::bpbd::common::messaging::session\\_id\\_type](#)

## 9.14 inc/common/utils/containers/array\_utils.hpp File Reference

```
#include <string>
#include <cstdlib>
#include <algorithm>
#include <functional>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
```

## Classes

- struct [uva::utils::containers::utils::T\\_IS\\_COMPARE\\_FUNC< ELEM\\_TYPE >](#)

### Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::containers](#)
- [uva::utils::containers::utils](#)

## Macros

- #define [BSEARCH\\_ONE\\_FIELD](#)(FIELD\_NAME, RETURN\_STATEMENT)
- #define [BSEARCH\\_TWO\\_FIELDS](#)(FIELD\_ONE, FIELD\_TWO)
- #define [DECLARE\\_STATIC\\_BSEARCH\\_ID\\_FIELD\\_COMPARE\\_FUNC](#)(COMPARE\_STATEMENT, ...)

## Functions

- `template<typename ARR_ELEM_TYPE >`  
`bool uva::utils::containers::utils::my_bsearch_id (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const typename ARR_ELEM_TYPE::TIdType key, const ARR_ELEM_TYPE *&found_elem)`
- `template<typename ARR_ELEM_TYPE , typename IDX_TYPE , typename KEY_TYPE >`  
`bool uva::utils::containers::utils::my_bsearch_id (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const KEY_TYPE key, IDX_TYPE &found_pos)`
- `template<typename ARR_ELEM_TYPE >`  
`bool uva::utils::containers::utils::my_bsearch_wordId_ctxId (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const uint32_t key1, const uint32_t key2, uint32_t &found_pos)`
- `template<typename ARR_ELEM_TYPE , typename KEY_TYPE >`  
`bool uva::utils::containers::utils::my_isearch_id (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const KEY_TYPE key, const ARR_ELEM_TYPE *&found_elem)`
- `template<typename ARR_ELEM_TYPE , typename INDEX_TYPE , typename KEY_TYPE >`  
`bool uva::utils::containers::utils::my_bsearch (const ARR_ELEM_TYPE *array, INDEX_TYPE l_idx, INDEX_TYPE u_idx, const KEY_TYPE key, INDEX_TYPE &mid_pos)`
- `template<typename ARR_ELEM_TYPE >`  
`bool uva::utils::containers::utils::my_isearch_id (const ARR_ELEM_TYPE *array, int64_t l_idx, int64_t u_idx, const typename ARR_ELEM_TYPE::TIdType key, const ARR_ELEM_TYPE *&found_elem)`
- `template<typename ELEM_TYPE >`  
`void uva::utils::containers::utils::my_sort (ELEM_TYPE *array_begin, const uint32_t array_size, typename T_IS_COMPARE_FUNC< ELEM_TYPE >::func_type is_less_func)`
- `template<typename ELEM_TYPE , typename T_IS_COMPARE_FUNC< ELEM_TYPE >::func_ptr IS_LESS_FUNC>`  
`void uva::utils::containers::utils::my_sort (ELEM_TYPE *array_begin, const uint32_t array_size)`
- `template<typename ELEM_TYPE , bool IS_PROGRESS = true>`  
`bool uva::utils::containers::utils::is_less (const ELEM_TYPE &first, const ELEM_TYPE &second)`

### 9.14.1 Macro Definition Documentation

#### 9.14.1.1 #define BSEARCH\_ONE\_FIELD( FIELD\_NAME, RETURN\_STATEMENT )

**Value:**

```

ASSERT_SANITY_THROW(((l_idx < 0) || (l_idx > u_idx)), \
 string("Impossible search parameters, l_idx = ") + \
 std::to_string(l_idx) + string(", u_idx = ") + \
 std::to_string(u_idx) + string("!")); \
int64_t mid_pos;
while (l_idx <= u_idx) {
 mid_pos = (l_idx + u_idx) / 2;
 LOG_DEBUG4 << "l_idx = " << SSTR(l_idx) << ", u_idx = "
 << SSTR(u_idx) << ", mid_pos = " << SSTR(mid_pos) <<
END_LOG; \
 if (key < array[mid_pos].FIELD_NAME) {
 u_idx = mid_pos - 1;
 } else {
 if (key > array[mid_pos].FIELD_NAME) {
 l_idx = mid_pos + 1;
 } else {
 LOG_DEBUG4 << "The found mid_pos = "
 << SSTR(mid_pos) << END_LOG;
 RETURN_STATEMENT;
 return true;
 }
 }
}
return false;

```

Definition at line 60 of file array\_utils.hpp.

#### 9.14.1.2 #define BSEARCH\_TWO\_FIELDS( FIELD\_ONE, FIELD\_TWO )

Definition at line 90 of file array\_utils.hpp.



## 9.14.1.3 #define DECLARE\_STATIC\_BSEARCH\_ID\_FIELD\_COMPARE\_FUNC( COMPARE\_STATEMENT, ... )

**Value:**

```

template<typename ARR_ELEM_TYPE> \
 static inline bool my_bsearch_id(const ARR_ELEM_TYPE * array, \
 int64_t l_idx, int64_t u_idx, \
 const ARR_ELEM_TYPE * & found_elem, __VA_ARGS__) { \
 ASSERT_SANITY_THROW(((l_idx < 0) || (l_idx > u_idx)), \
 string("Impossible search parameters, l_idx = ") + \
 std::to_string(l_idx) + string(", u_idx = ") + \
 std::to_string(u_idx) + string("!!")); \
 int64_t mid_pos; \
 while (l_idx <= u_idx) { \
 mid_pos = (l_idx + u_idx) / 2; \
 LOG_DEBUG4 << "l_idx = " << SSTR(l_idx) << ", u_idx = " \
 << SSTR(u_idx) << ", mid_pos = " << SSTR(mid_pos) << \
END_LOG; \
 int64_t result = COMPARE_STATEMENT; \
 if (result < 0) { \
 u_idx = mid_pos - 1; \
 } else { \
 if (result == 0) { \
 LOG_DEBUG4 << "The found mid_pos = " << SSTR(mid_pos) << \
END_LOG; \
 found_elem = &array[mid_pos]; \
 return true; \
 } else { \
 l_idx = mid_pos + 1; \
 } \
 } \
 } \
 return false; \
}

```

This is a binary search algorithm for some ordered array

**Parameters**

|                          |                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------|
| <i>ARR_ELEM_TYPE</i>     | the array element structure, must have id field as this method will specifically use it to compare elements. |
| <i>COMPARE_STATEMENT</i> | the compare statement that is to return a compare result                                                     |
| <i>array</i>             | the pointer to the first array element                                                                       |
| <i>l_idx</i>             | the initial left border index for searching                                                                  |
| <i>u_idx</i>             | the initial right border index for searching                                                                 |
| <i>found_elem</i>        | the out parameter that stores the pointer to the found element, if any                                       |
| <i>the</i>               | variable list of arguments needed for the compare statement                                                  |

**Returns**

true if the element was found, otherwise false

**Exceptions**

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| <i>Exception</i> | in case (l_idx < 0)    (l_idx > u_idx), with sanity checks on |
|------------------|---------------------------------------------------------------|

Definition at line 136 of file array\_utils.hpp.

## 9.15 inc/common/utls/containers/circular\_queue.hpp File Reference

```

#include <string>
#include <ostream>
#include <cstring>
#include <algorithm>
#include "common/utls/logging/logger.hpp"
#include "common/utls/exceptions.hpp"
#include "common/utls/string_utils.hpp"

```

## Classes

- class [uva::utils::containers::circular\\_queue< elem\\_type, capacity >](#)

## Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::containers](#)

## 9.16 inc/common/utils/containers/dynamic\_memory\_arrays.hpp File Reference

```
#include <functional>
#include <cmath>
#include <algorithm>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/containers/array_utils.hpp"
#include "common/utils/math_utils.hpp"
```

## Classes

- class [uva::utils::containers::mem\\_increase\\_strategy](#)
- struct [uva::utils::containers::ELEMENT\\_DEALLOC\\_FUNC< ELEM\\_TYPE >](#)
- class [uva::utils::containers::dynamic\\_stack\\_array< ELEMENT\\_TYPE, IDX\\_DATA\\_TYPE, INITIAL\\_CAPACITY, DESTRUCTOR >](#)

## Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::containers](#)

## Macros

- #define [EXTRACT\\_P](#)(NAME\_PTR) ELEMENT\_TYPE\_PTR & NAME\_PTR = extract\_bytes<sizeof (IDX\_DATA\_TYPE), ELEMENT\_TYPE\_PTR > (m\_params);
- #define [EXTRACT\\_C](#)(NAME\_CAPACITY) IDX\_DATA\_TYPE & NAME\_CAPACITY = extract\_bytes<0, IDX\_DATA\_TYPE > (m\_params);
- #define [EXTRACT\\_S](#)(NAME\_SIZE) IDX\_DATA\_TYPE & NAME\_SIZE = extract\_bytes<sizeof (ELEMENT\_TYPE\_PTR) + sizeof (IDX\_DATA\_TYPE), IDX\_DATA\_TYPE > (m\_params);
- #define [EXTRACT\\_PC](#)(NAME\_PTR, NAME\_CAPACITY)
- #define [EXTRACT\\_PS](#)(NAME\_PTR, NAME\_SIZE)
- #define [EXTRACT\\_PCS](#)(NAME\_PTR, NAME\_CAPACITY, NAME\_SIZE)

## Typedefs

- typedef std::function< size\_t(const size\_t) > [uva::utils::containers::TCapacityIncFunc](#)

## Enumerations

- enum `uva::utls::containers::mem_inc_types_enum` {  
`uva::utls::containers::UNDEFINED` = 0, `uva::utls::containers::CONSTANT` = UNDEFINED + 1, `uva::utls::containers::LINEAR` = CONSTANT + 1, `uva::utls::containers::LOG_2` = LINEAR + 1,  
`uva::utls::containers::LOG_10` = LOG\_2 + 1, `uva::utls::containers::size` = LOG\_10 + 1 }

## Functions

- `mem_increase_strategy` `uva::utls::containers::get_mem_incr_strat` (const `mem_inc_types_enum` `stype`, const `size_t` `min_mem_inc`, const `size_t` `mem_inc_factor`)

## Variables

- const char \*const `uva::utls::containers::_memIncTypesEnumStr` [`mem_inc_types_enum::size`] = {"CONSTANT", "LINEAR", "LOG\_2", "LOG\_10"}

### 9.16.1 Macro Definition Documentation

9.16.1.1 `#define EXTRACT_C( NAME_CAPACITY ) IDX_DATA_TYPE & NAME_CAPACITY = extract_bytes<0, IDX_DATA_TYPE> > (m_params);`

Definition at line 236 of file `dynamic_memory_arrays.hpp`.

9.16.1.2 `#define EXTRACT_P( NAME_PTR ) ELEMENT_TYPE_PTR & NAME_PTR = extract_bytes<sizeof (IDX_DATA_TYPE), ELEMENT_TYPE_PTR> (m_params);`

Definition at line 233 of file `dynamic_memory_arrays.hpp`.

9.16.1.3 `#define EXTRACT_PC( NAME_PTR, NAME_CAPACITY )`

**Value:**

```
EXTRACT_P (NAME_PTR); \
 EXTRACT_C (NAME_CAPACITY);
```

Definition at line 242 of file `dynamic_memory_arrays.hpp`.

9.16.1.4 `#define EXTRACT_PCS( NAME_PTR, NAME_CAPACITY, NAME_SIZE )`

**Value:**

```
EXTRACT_P (NAME_PTR); \
 EXTRACT_C (NAME_CAPACITY); \
 EXTRACT_S (NAME_SIZE);
```

Definition at line 250 of file `dynamic_memory_arrays.hpp`.

9.16.1.5 `#define EXTRACT_PS( NAME_PTR, NAME_SIZE )`

**Value:**

```
EXTRACT_P (NAME_PTR); \
 EXTRACT_S (NAME_SIZE);
```

Definition at line 246 of file `dynamic_memory_arrays.hpp`.

```
9.16.1.6 #define EXTRACT_S(NAME_SIZE) IDX_DATA_TYPE & NAME_SIZE = extract_bytes<sizeof (ELEMENT_TYPE_PTR) +
 sizeof (IDX_DATA_TYPE), IDX_DATA_TYPE > (m_params);
```

Definition at line 239 of file `dynamic_memory_arrays.hpp`.

## 9.17 `inc/common/utls/containers/fixed_size_hashmap.hpp` File Reference

```
#include "common/utls/logging/logger.hpp"
#include "common/utls/exceptions.hpp"
#include "common/utls/math_utils.hpp"
#include "common/utls/hashing_utils.hpp"
#include "common/utls/containers/array_utils.hpp"
```

### Classes

- class [uva::utls::containers::fixed\\_size\\_hashmap< ELEMENT\\_TYPE, KEY\\_TYPE, IDX\\_TYPE >](#)

### Namespaces

- [uva](#)
- [uva::utls](#)
- [uva::utls::containers](#)

## 9.18 `inc/common/utls/containers/greedy_memory_allocator.hpp` File Reference

```
#include <typeinfo>
#include "common/utls/logging/logger.hpp"
#include "common/utls/exceptions.hpp"
#include "common/utls/containers/greedy_memory_storage.hpp"
```

### Classes

- class [uva::utls::containers::alloc::greedy\\_memory\\_allocator< T >](#)
- struct [uva::utls::containers::alloc::greedy\\_memory\\_allocator< T >::rebind< U >](#)

### Namespaces

- [uva](#)
- [uva::utls](#)
- [uva::utls::containers](#)
- [uva::utls::containers::alloc](#)

### Functions

- template<typename TContainer , typename TAllocator >  
void [uva::utls::containers::alloc::allocate\\_container](#) (TContainer \*\*ppContainer, TAllocator \*\*ppAllocator,  
const size\_t numEntries, const string ctName, const float factor=UNORDERED\_MAP\_MEMORY\_FACTOR  
OR)

- `template<typename TContainer , typename TAllocator >`  
`void uva::utls::containers::alloc::reserve_mem_unordered_map (TContainer **ppContainer, TAllocator **ppAllocator, const size_t numEntries, const string ctName, const float factor=UNORDERED_MAP_↵`  
`MEMORY_FACTOR)`
- `template<typename TContainer , typename TAllocator >`  
`void uva::utls::containers::alloc::deallocate_container (TContainer **ppContainer, TAllocator **ppAllocator)`
- `template<typename T , typename U >`  
`bool uva::utls::containers::alloc::operator== (const greedy_memory_allocator< T > &, const greedy_↵`  
`memory_allocator< U > &)`
- `template<typename T >`  
`bool uva::utls::containers::alloc::operator== (const greedy_memory_allocator< T > &, const greedy_↵`  
`memory_allocator< T > &)`
- `template<typename T , typename U >`  
`bool uva::utls::containers::alloc::operator!= (const greedy_memory_allocator< T > &, const greedy_↵`  
`memory_allocator< U > &)`
- `template<typename T >`  
`bool uva::utls::containers::alloc::operator!= (const greedy_memory_allocator< T > &, const greedy_↵`  
`memory_allocator< T > &)`

## 9.19 inc/common/utls/containers/greedy\_memory\_storage.hpp File Reference

```
#include <vector>
#include "common/utls/logging/logger.hpp"
#include "common/utls/exceptions.hpp"
```

### Classes

- `class uva::utls::containers::greedy_memory_storage`

### Namespaces

- `uva`
- `uva::utls`
- `uva::utls::containers`

## 9.20 inc/common/utls/containers/upp\_diag\_matrix.hpp File Reference

```
#include <string>
#include <cstdlib>
#include <algorithm>
#include <functional>
#include "common/utls/logging/logger.hpp"
#include "common/utls/exceptions.hpp"
```

### Classes

- `class uva::utls::containers::upp_diag_matrix< element_type >`

## Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::containers](#)

## 9.21 inc/common/utils/exceptions.hpp File Reference

```
#include <exception>
#include <string>
#include "common/utils/logging/logger.hpp"
```

## Classes

- class [uva::utils::exceptions::uva\\_exception](#)

## Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::exceptions](#)

## Macros

- `#define THROW\_EXCEPTION(text)`
- `#define THROW\_MUST\_OVERRIDE() THROW\_EXCEPTION("Must be overridden in the sub class!")`
- `#define THROW\_MUST\_NOT\_CALL() THROW\_EXCEPTION("Must not be called, is not needed!")`
- `#define THROW\_NOT\_IMPLEMENTED() THROW\_EXCEPTION("This functionality is not yet implemented!")`
- `#define ASSERT\_CONDITION\_THROW(CONDITION, MESSAGE)`
- `#define ASSERT\_SANITY\_THROW(CONDITION, MESSAGE) ASSERT\_CONDITION\_THROW(DO_SANITY_CHECKS && (CONDITION), MESSAGE);`

## Variables

- `constexpr bool uva::utils::exceptions::DO\_SANITY\_CHECKS = false`

### 9.21.1 Macro Definition Documentation

#### 9.21.1.1 `#define ASSERT\_CONDITION\_THROW( CONDITION, MESSAGE )`

##### Value:

```
if (CONDITION) { \
 THROW_EXCEPTION (MESSAGE); \
}
```

Definition at line 59 of file exceptions.hpp.

#### 9.21.1.2 `#define ASSERT\_SANITY\_THROW( CONDITION, MESSAGE ) ASSERT\_CONDITION\_THROW(DO_SANITY_CHECKS && (CONDITION), MESSAGE);`

Definition at line 63 of file exceptions.hpp.

## 9.21.1.3 #define THROW\_EXCEPTION( text )

## Value:

```
{ \
 stringstream msg; \
 if (logger::get_reporting_level() >= debug_levels_enum::INFO3) { \
 msg << __FILENAME__ << " : " << __FUNCTION__ \
 << " (...) " << __LINE__ << " : " << (text); \
 } else { \
 msg << __FILENAME__ << " : " << (text); \
 } \
 LOG_DEBUG << "<THROWING> " << msg.str() << END_LOG; \
 throw uva_exception(msg.str()); \
}
```

Definition at line 44 of file exceptions.hpp.

## 9.21.1.4 #define THROW\_MUST\_NOT\_CALL( ) THROW\_EXCEPTION("Must not be called, is not needed!")

Definition at line 57 of file exceptions.hpp.

## 9.21.1.5 #define THROW\_MUST\_OVERRIDE( ) THROW\_EXCEPTION("Must be overridden in the sub class!")

Definition at line 56 of file exceptions.hpp.

## 9.21.1.6 #define THROW\_NOT\_IMPLEMENTED( ) THROW\_EXCEPTION("This functionality is not yet implemented!")

Definition at line 58 of file exceptions.hpp.

## 9.22 inc/common/utils/file/afire\_reader.hpp File Reference

```
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/string_utils.hpp"
#include "common/utils/file/text_piece_reader.hpp"
```

## Classes

- class [uva::utils::file::afire\\_reader](#)

## Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::file](#)

## 9.23 inc/common/utils/file/cstyle\_file\_reader.hpp File Reference

```
#include <cstring>
```

```
#include <stdio>
#include <stdio.h>
#include <stdlib>
#include "common/utls/logging/logger.hpp"
#include "common/utls/exceptions.hpp"
#include "common/utls/string_utils.hpp"
#include "common/utls/file/afireader.hpp"
```

## Classes

- class [uva::utls::file::cstyle\\_file\\_reader](#)

## Namespaces

- [uva](#)
- [uva::utls](#)
- [uva::utls::file](#)

## 9.24 inc/common/utls/file/file\_stream\_reader.hpp File Reference

```
#include <cstring>
#include <fstream>
#include "common/utls/logging/logger.hpp"
#include "common/utls/exceptions.hpp"
#include "common/utls/string_utils.hpp"
#include "common/utls/file/text_piece_reader.hpp"
```

## Classes

- class [uva::utls::file::file\\_stream\\_reader](#)

## Namespaces

- [uva](#)
- [uva::utls](#)
- [uva::utls::file](#)

## 9.25 inc/common/utls/file/memory\_mapped\_file\_reader.hpp File Reference

```
#include <string>
```



```

#include <unistd.h>
#include <fcntl.h>
#include <stdio.h>
#include <sys/stat.h>
#include <sys/types.h>
#include <inttypes.h>
#include <stdlib.h>
#include <sys/mman.h>
#include <stdint.h>
#include <cstring>
#include <errno.h>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/string_utils.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/file/afireader.hpp"

```

## Classes

- class [uva::utils::file::memory\\_mapped\\_file\\_reader](#)

## Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::file](#)

## 9.26 inc/common/utils/file/text\_piece\_reader.hpp File Reference

```

#include <string.h>
#include <cstring>
#include <algorithm>
#include <string>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/string_utils.hpp"

```

## Classes

- class [uva::utils::file::text\\_piece\\_reader](#)

## Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::file](#)

## Functions

- ostream & [uva::utils::file::operator<<](#) (ostream &output, const text\_piece\_reader &val)

- `template<size_t NUM_TOKENS>`  
`string uva::utils::file::tokens_to_string (const text_piece_reader tokens[NUM_TOKENS], const size_t begin↵`  
`_idx, const size_t end_idx)`

## 9.27 inc/common/utils/hashing\_utils.hpp File Reference

```
#include <string>
#include <cmath>
#include <stdint.h>
#include "common/utils/logging/logger.hpp"
```

### Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::hashing](#)

### Macros

- `#define get16bits(d)`
- `#define A 54059 /* a prime */`
- `#define B 76963 /* another prime */`
- `#define C 86969 /* yet another prime */`
- `#define cwfold(a, b, lo, hi) { p = (uint32_t)(a) * (uint64_t)(b); lo ^= (uint32_t)p; hi ^= (uint32_t)(p >> 32); }`
- `#define cwmixa(in) { cwfold( in, m, k, h ); }`
- `#define cwmixb(in) { cwfold( in, n, h, k ); }`

### 9.27.1 Macro Definition Documentation

#### 9.27.1.1 `#define A 54059 /* a prime */`

This is a hash function found online <http://stackoverflow.com/questions/8317508/hash-function-for-a-st>  
 It's origin is unknown but it proves to work perfect (without collisions) on both test sets! So I do not need to complicate a hash map to a multi-map for now! Note: The time complexity is linear in the length of the word. Note: There are no observed collisions up until now. Note: But it is not yet known if this hash is collision free.

#### Parameters

|            |                  |
|------------|------------------|
| <i>str</i> | the word to hash |
|------------|------------------|

#### Returns

the resulting hash

Definition at line 217 of file hashing\_utils.hpp.

#### 9.27.1.2 `#define B 76963 /* another prime */`

Definition at line 218 of file hashing\_utils.hpp.

#### 9.27.1.3 `#define C 86969 /* yet another prime */`

Definition at line 219 of file hashing\_utils.hpp.

9.27.1.4 `#define cwfold( a, b, lo, hi ) { p = (uint32_t)(a) * (uint64_t)(b); lo ^= (uint32_t)p; hi ^= (uint32_t)(p >> 32); }`

9.27.1.5 `#define cwmixa( in ) { cwfold( in, m, k, h ); }`

9.27.1.6 `#define cwmixb( in ) { cwfold( in, n, h, k ); }`

9.27.1.7 `#define get16bits( d )`

#### Value:

```
((((uint_fast32_t)((const uint8_t *) (d))[1])) << 8) \
+ (uint_fast32_t)((const uint8_t *) (d))[0])
```

The string hashing functions: computePaulHsiehHash - This one showed the worst speed on a test run compute↵  
Djb2Hash - This one showed medium speed on a test run computePrimesHash - This one showed medium speed  
on a test run computeRSHash - This one showed the best speed on a test run

Note that the XXHASH should be the best with respect to everything, see: <https://github.com/↵Cyan4973/xxHash>

Yet it is not even on a 64 bit machine with XXH64 it is beaten by RSHash! At least the hash based trie performs faster (200 vs 250 CPU seconds) on a 20 Gb model with 100.000.000 queries. So for us XXHASH is not the best. The following is the Paul Hsieh implementation of a string hashing function This one seems to be very efficient in computation time and has good distribution: <http://www.azillionmonkeys.com/qed/hash.html>

Definition at line 118 of file hashing\_utils.hpp.

## 9.28 inc/common/utls/logging/logger.hpp File Reference

```
#include <mutex>
#include <iostream>
#include <sstream>
#include <vector>
#include <time.h>
#include <string.h>
```

### Classes

- struct [uva::utls::logging::logging\\_synch](#)
- class [uva::utls::logging::logger](#)

### Namespaces

- [uva](#)
- [uva::utls](#)
- [uva::utls::logging](#)

### Macros

- `#define SSTR(x) std::dec << (x)`
- `#define STRINGIZE(x) STRINGIZE2(x)`
- `#define STRINGIZE2(x) #x`
- `#define LINE_STRING STRINGIZE(__LINE__)`
- `#define PROGRESS_UPDATE_PERIOD 0.05`

- `#define LOGGER(level)`
- `#define \_\_FILENAME\_\_ (strchr(__FILE__, '/') ? strchr(__FILE__, '/') + 1 : __FILE__)`
- `#define LOGGER\_DEBUG(level)`
- `#define LOG\_ERROR LOGGER(debug_levels_enum::ERROR)`
- `#define LOG\_WARNING LOGGER(debug_levels_enum::WARNING)`
- `#define LOG\_USAGE LOGGER(debug_levels_enum::USAGE)`
- `#define LOG\_RESULT LOGGER(debug_levels_enum::RESULT)`
- `#define LOG\_INFO LOGGER(debug_levels_enum::INFO)`
- `#define LOG\_INFO1 LOGGER(debug_levels_enum::INFO1)`
- `#define LOG\_INFO2 LOGGER(debug_levels_enum::INFO2)`
- `#define LOG\_INFO3 LOGGER(debug_levels_enum::INFO3)`
- `#define LOG\_DEBUG LOGGER\_DEBUG(debug_levels_enum::DEBUG)`
- `#define LOG\_DEBUG1 LOGGER\_DEBUG(debug_levels_enum::DEBUG1)`
- `#define LOG\_DEBUG2 LOGGER\_DEBUG(debug_levels_enum::DEBUG2)`
- `#define LOG\_DEBUG3 LOGGER\_DEBUG(debug_levels_enum::DEBUG3)`
- `#define LOG\_DEBUG4 LOGGER\_DEBUG(debug_levels_enum::DEBUG4)`
- `#define END\_LOG`
- `#define ERROR\_PARAM\_VALUE "ERROR"`
- `#define WARNING\_PARAM\_VALUE "WARN"`
- `#define USAGE\_PARAM\_VALUE "USAGE"`
- `#define RESULT\_PARAM\_VALUE "RESULT"`
- `#define INFO\_PARAM\_VALUE "INFO"`
- `#define INFO1\_PARAM\_VALUE "INFO1"`
- `#define INFO2\_PARAM\_VALUE "INFO2"`
- `#define INFO3\_PARAM\_VALUE "INFO3"`
- `#define DEBUG\_PARAM\_VALUE "DEBUG"`
- `#define DEBUG1\_PARAM\_VALUE "DEBUG1"`
- `#define DEBUG2\_PARAM\_VALUE "DEBUG2"`
- `#define DEBUG3\_PARAM\_VALUE "DEBUG3"`
- `#define DEBUG4\_PARAM\_VALUE "DEBUG4"`
- `#define WHITE\_SPACE\_SEPARATOR " "`

## Enumerations

- `enum uva::utils::logging::debug\_levels\_enum {  
uva::utils::logging::ERROR = 0, uva::utils::logging::WARNING = ERROR + 1, uva::utils::logging::USAGE =  
WARNING + 1, uva::utils::logging::RESULT = USAGE + 1,  
uva::utils::logging::INFO = RESULT + 1, uva::utils::logging::INFO1 = INFO + 1, uva::utils::logging::INFO2 =  
INFO1 + 1, uva::utils::logging::INFO3 = INFO2 + 1,  
uva::utils::logging::DEBUG = INFO3 + 1, uva::utils::logging::DEBUG1 = DEBUG + 1, uva::utils::logging::DEBUG2 =  
DEBUG1 + 1, uva::utils::logging::DEBUG3 = DEBUG2 + 1,  
uva::utils::logging::DEBUG4 = DEBUG3 + 1, uva::utils::logging::size = DEBUG4 + 1 }`

## Functions

- `std::ostream & uva::utils::logging::operator<< (std::ostream &stream, const unsigned char &value)`
- `std::ostream & uva::utils::logging::operator<< (std::ostream &stream, const signed char &value)`

### 9.28.1 Macro Definition Documentation

#### 9.28.1.1 `#define __FILENAME__ (strchr(__FILE__, '/') ? strchr(__FILE__, '/') + 1 : __FILE__)`

Definition at line 90 of file `logger.hpp`.

**9.28.1.2 #define DEBUG1\_PARAM\_VALUE "DEBUG1"**

Definition at line 131 of file logger.hpp.

**9.28.1.3 #define DEBUG2\_PARAM\_VALUE "DEBUG2"**

Definition at line 132 of file logger.hpp.

**9.28.1.4 #define DEBUG3\_PARAM\_VALUE "DEBUG3"**

Definition at line 133 of file logger.hpp.

**9.28.1.5 #define DEBUG4\_PARAM\_VALUE "DEBUG4"**

Definition at line 134 of file logger.hpp.

**9.28.1.6 #define DEBUG\_PARAM\_VALUE "DEBUG"**

Definition at line 130 of file logger.hpp.

**9.28.1.7 #define END\_LOG****Value:**

```
endl << flush; \
}
```

Definition at line 117 of file logger.hpp.

**9.28.1.8 #define ERROR\_PARAM\_VALUE "ERROR"**

Definition at line 122 of file logger.hpp.

**9.28.1.9 #define INFO1\_PARAM\_VALUE "INFO1"**

Definition at line 127 of file logger.hpp.

**9.28.1.10 #define INFO2\_PARAM\_VALUE "INFO2"**

Definition at line 128 of file logger.hpp.

**9.28.1.11 #define INFO3\_PARAM\_VALUE "INFO3"**

Definition at line 129 of file logger.hpp.

**9.28.1.12 #define INFO\_PARAM\_VALUE "INFO"**

Definition at line 126 of file logger.hpp.

9.28.1.13 **#define LINE\_STRING STRINGIZE(\_\_LINE\_\_)**

Definition at line 78 of file logger.hpp.

9.28.1.14 **#define LOG\_DEBUG LOGGER\_DEBUG(debug\_levels\_enum::DEBUG)**

Definition at line 111 of file logger.hpp.

9.28.1.15 **#define LOG\_DEBUG1 LOGGER\_DEBUG(debug\_levels\_enum::DEBUG1)**

Definition at line 112 of file logger.hpp.

9.28.1.16 **#define LOG\_DEBUG2 LOGGER\_DEBUG(debug\_levels\_enum::DEBUG2)**

Definition at line 113 of file logger.hpp.

9.28.1.17 **#define LOG\_DEBUG3 LOGGER\_DEBUG(debug\_levels\_enum::DEBUG3)**

Definition at line 114 of file logger.hpp.

9.28.1.18 **#define LOG\_DEBUG4 LOGGER\_DEBUG(debug\_levels\_enum::DEBUG4)**

Definition at line 115 of file logger.hpp.

9.28.1.19 **#define LOG\_ERROR LOGGER(debug\_levels\_enum::ERROR)**

Definition at line 103 of file logger.hpp.

9.28.1.20 **#define LOG\_INFO LOGGER(debug\_levels\_enum::INFO)**

Definition at line 107 of file logger.hpp.

9.28.1.21 **#define LOG\_INFO1 LOGGER(debug\_levels\_enum::INFO1)**

Definition at line 108 of file logger.hpp.

9.28.1.22 **#define LOG\_INFO2 LOGGER(debug\_levels\_enum::INFO2)**

Definition at line 109 of file logger.hpp.

9.28.1.23 **#define LOG\_INFO3 LOGGER(debug\_levels\_enum::INFO3)**

Definition at line 110 of file logger.hpp.

9.28.1.24 **#define LOG\_RESULT LOGGER(debug\_levels\_enum::RESULT)**

Definition at line 106 of file logger.hpp.

**9.28.1.25 #define LOG\_USAGE LOGGER(debug\_levels\_enum::USAGE)**

Definition at line 105 of file logger.hpp.

**9.28.1.26 #define LOG\_WARNING LOGGER(debug\_levels\_enum::WARNING)**

Definition at line 104 of file logger.hpp.

**9.28.1.27 #define LOGGER( level )**

**Value:**

```
{
 logging_synch::rec_scoped_lock lock(logging_synch::mv);\
 if (level > LOGER_M_GRAM_LEVEL_MAX) ;\
 else if (level > logger::get_reporting_level()) ; \
 else logger::get(level)
```

Definition at line 83 of file logger.hpp.

**9.28.1.28 #define LOGGER\_DEBUG( level )**

**Value:**

```
{
 logging_synch::rec_scoped_lock lock(logging_synch::mv);\
 if (level > LOGER_M_GRAM_LEVEL_MAX) ;\
 else if (level > logger::get_reporting_level()) ; \
 else logger::get(level, __FILENAME__, __FUNCTION__,\
 LINE_STRING)
```

Definition at line 92 of file logger.hpp.

**9.28.1.29 #define PROGRESS\_UPDATE\_PERIOD 0.05**

Definition at line 81 of file logger.hpp.

**9.28.1.30 #define RESULT\_PARAM\_VALUE "RESULT"**

Definition at line 125 of file logger.hpp.

**9.28.1.31 #define SSTR( x ) std::dec << (x)**

Definition at line 73 of file logger.hpp.

**9.28.1.32 #define STRINGIZE( x ) STRINGIZE2(x)**

Definition at line 76 of file logger.hpp.

**9.28.1.33 #define STRINGIZE2( x ) #x**

Definition at line 77 of file logger.hpp.

#### 9.28.1.34 `#define USAGE_PARAM_VALUE "USAGE"`

Definition at line 124 of file `logger.hpp`.

#### 9.28.1.35 `#define WARNING_PARAM_VALUE "WARN"`

Definition at line 123 of file `logger.hpp`.

#### 9.28.1.36 `#define WHITE_SPACE_SEPARATOR " "`

Definition at line 137 of file `logger.hpp`.

## 9.29 `inc/common/utils/math_utils.hpp` File Reference

```
#include <stdint>
#include <string>
#include <bitset>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
```

### Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::math](#)
- [uva::utils::math::const\\_expr](#)
- [uva::utils::math::log2](#)
- [uva::utils::math::bits](#)

### Macros

- `#define` [BYTE\\_IDX](#)(total\_bit\_pos) ((total\_bit\_pos) / NUM\_BITS\_IN\_UINT\_8)
- `#define` [REMAINING\\_BIT\\_IDX](#)(total\_bit\_pos) ((total\_bit\_pos) % NUM\_BITS\_IN\_UINT\_8)
- `#define` [NUM\\_FULL\\_BYTES](#)(number\_of\_bits) ((number\_of\_bits) / NUM\_BITS\_IN\_UINT\_8)
- `#define` [NUM\\_BITS\\_REMAINDER](#)(number\_of\_bits) ((number\_of\_bits) % NUM\_BITS\_IN\_UINT\_8)
- `#define` [NUM\\_BYTES\\_4\\_BITS](#)(number\_of\_bits) (((number\_of\_bits) + (NUM\_BITS\_IN\_UINT\_8 - 1)) / NUM\_BITS\_IN\_UINT\_8)
- `#define` [BYTES\\_TO\\_BITS](#)(number\_of\_bytes) ((number\_of\_bytes) \* NUM\_BITS\_IN\_UINT\_8)
- `#define` [VALUE\\_LEN\\_BYTES](#)(VALUE) static\_cast<uint8\_t> (const\_expr::ceil(const\_expr::log2(VALUE)/8))
- `#define` [HANDLE\\_ENDIAN](#)(value\_type, value)

### Functions

- constexpr double [uva::utils::math::const\\_expr::log2](#) (double value, double pow=0.0)
- constexpr uint64\_t [uva::utils::math::const\\_expr::ceil](#) (double value)
- constexpr uint64\_t [uva::utils::math::const\\_expr::power](#) (uint64\_t value, uint8\_t pow)



### 9.29.1 Macro Definition Documentation

#### 9.29.1.1 `#define BYTE_IDX( total_bit_pos ) ((total_bit_pos) / NUM_BITS_IN_UINT_8)`

Definition at line 136 of file math\_utils.hpp.

#### 9.29.1.2 `#define BYTES_TO_BITS( number_of_bytes ) ((number_of_bytes) * NUM_BITS_IN_UINT_8)`

Definition at line 147 of file math\_utils.hpp.

#### 9.29.1.3 `#define HANDLE_ENDIAN( value_type, value )`

Value:

```
if(sizeof(value_type) == 2) { \
 (value) = __builtin_bswap16((value)); \
} else { \
 if(sizeof(value_type) == 4) { \
 (value) = __builtin_bswap32((value)); \
 } else { \
 if(sizeof(value_type) == 8) { \
 (value) = __builtin_bswap64((value)); \
 } else { \
 throw uva_exception("HANDLE_ENDIAN(value_type, value): Unsupported value type!"); \
 } \
 } \
}
```

Definition at line 156 of file math\_utils.hpp.

#### 9.29.1.4 `#define NUM_BITS_REMAINDER( number_of_bits ) ((number_of_bits) % NUM_BITS_IN_UINT_8)`

Definition at line 143 of file math\_utils.hpp.

#### 9.29.1.5 `#define NUM_BYTES_4_BITS( number_of_bits ) (((number_of_bits) + (NUM_BITS_IN_UINT_8 - 1)) / NUM_BITS_IN_UINT_8)`

Definition at line 145 of file math\_utils.hpp.

#### 9.29.1.6 `#define NUM_FULL_BYTES( number_of_bits ) ((number_of_bits) / NUM_BITS_IN_UINT_8)`

Definition at line 141 of file math\_utils.hpp.

#### 9.29.1.7 `#define REMAINING_BIT_IDX( total_bit_pos ) ((total_bit_pos) % NUM_BITS_IN_UINT_8)`

Definition at line 138 of file math\_utils.hpp.

#### 9.29.1.8 `#define VALUE_LEN_BYTES( VALUE ) static_cast<uint8_t>(const_expr::ceil(const_expr::log2(VALUE)/8))`

Definition at line 149 of file math\_utils.hpp.

## 9.30 inc/common/utls/monitor/statistics\_monitor.hpp File Reference

```
#include "common/utls/exceptions.hpp"
```

## Classes

- struct [uva::utils::monitor::memory\\_usage](#)
- class [uva::utils::monitor::stat\\_monitor](#)

## Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::monitor](#)

## Typedefs

- typedef memory\_usage [uva::utils::monitor::TMemoryUsage](#)

## Variables

- const uint32\_t [uva::utils::monitor::BYTES\\_ONE\\_MB](#) = 1024u

## 9.31 inc/common/utils/string\_utils.hpp File Reference

```
#include <locale>
#include <string>
#include <vector>
#include <sstream>
#include <cstddef>
#include <limits>
#include <cstring>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
```

## Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::text](#)

## Macros

- #define [valid\\_digit\(c\)](#) ((c) >= '0' && (c) <= '9')

## Variables

- const string [uva::utils::text::UTF8\\_ASCII\\_WHITESPACES](#) = u8"\t\f\v\n\r "
- const string [uva::utils::text::UTF8\\_ASCII\\_PUNCTUATIONS](#) = u8".,?!/\"'@#\$\$%^&\*()[ ]{}\_+\*=<>~|\\;:"
- const char [uva::utils::text::ASCII\\_SPACE\\_CHAR](#) = ' '
- const string [uva::utils::text::UTF8\\_SPACE\\_STRING](#) = u8" "
- const string [uva::utils::text::UTF8\\_EMPTY\\_STRING](#) = u8""
- const string [uva::utils::text::UTF8\\_NEW\\_LINE\\_STRING](#) = u8"\n"

### 9.31.1 Macro Definition Documentation

#### 9.31.1.1 `#define valid_digit( c ) ((c) >= '0' && (c) <= '9')`

Definition at line 318 of file string\_utils.hpp.

## 9.32 inc/common/utls/threads.hpp File Reference

```
#include <atomic>
#include <thread>
#include <mutex>
#include <condition_variable>
#include <functional>
```

### Namespaces

- [uva](#)
- [uva::utls](#)
- [uva::utls::threads](#)

### Typedefs

- typedef lock\_guard< recursive\_mutex > [uva::utls::threads::recursive\\_guard](#)
- typedef lock\_guard< mutex > [uva::utls::threads::scoped\\_guard](#)
- typedef unique\_lock< mutex > [uva::utls::threads::unique\\_guard](#)
- typedef atomic< bool > [uva::utls::threads::a\\_bool\\_flag](#)
- typedef const a\_bool\_flag & [uva::utls::threads::acr\\_bool\\_flag](#)

## 9.33 inc/main.hpp File Reference

```
#include <string>
#include <stdexcept>
#include <execinfo.h>
#include <INI.h>
#include "common/utls/exceptions.hpp"
#include "common/utls/logging/logger.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::common](#)

### Macros

- #define [SAFE\\_DESTROY](#)(ptr)
- #define [MAX\\_STACK\\_TRACE\\_LEN](#) 100
- #define [GET\\_ASSERT](#)(ini, section, key, value\_str)

## Functions

- template<typename INT\_TYPE >  
INT\_TYPE [uva::smt::bpbd::common::get\\_integer](#) (INI<> &ini, string section, string key)
- string [uva::smt::bpbd::common::get\\_string](#) (INI<> &ini, string section, string key)
- float [uva::smt::bpbd::common::get\\_float](#) (INI<> &ini, string section, string key)

### 9.33.1 Macro Definition Documentation

#### 9.33.1.1 #define GET\_ASSERT( ini, section, key, value\_str )

##### Value:

```
const string value_str = ini.get(section, key, UNKNOWN_INI_FILE_VALUE); \
 ASSERT_CONDITION_THROW((value_str == UNKNOWN_INI_FILE_VALUE), \
 string("Could not find '[' + section + string("]"/) + \
 key + string("' section/key in the configuration file!"));
```

Definition at line 98 of file main.hpp.

#### 9.33.1.2 #define MAX\_STACK\_TRACE\_LEN 100

Definition at line 77 of file main.hpp.

#### 9.33.1.3 #define SAFE\_DESTROY( ptr )

##### Value:

```
if (ptr != NULL) { \
 delete ptr; \
 ptr = NULL; \
}
```

Definition at line 47 of file main.hpp.

## 9.34 inc/server/cmd\_line\_handler.hpp File Reference

```
#include "common/utils/logging/logger.hpp"
#include "server/server_parameters.hpp"
#include "server/translation_server.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

## Functions

- void [uva::smt::bpbd::server::stop](#) (translation\_server &server, thread &server\_thread)
- void [uva::smt::bpbd::server::print\\_the\\_prompt](#) ()
- void [uva::smt::bpbd::server::print\\_server\\_commands](#) ()

- bool [uva::smt::bpbd::server::begins\\_with](#) (const string &str, const string &prefix)
- string [uva::smt::bpbd::server::get\\_string\\_value](#) (const string &str, const string &prefix)
- int32\_t [uva::smt::bpbd::server::get\\_int\\_value](#) (const string &str, const string &prefix)
- float [uva::smt::bpbd::server::get\\_float\\_value](#) (const string &str, const string &prefix)
- void [uva::smt::bpbd::server::set\\_log\\_level](#) (const string &cmd, const string &prefix)
- void [uva::smt::bpbd::server::set\\_num\\_threads](#) ([server\\_parameters](#) &params, [translation\\_server](#) &server, const string &cmd, const string &prefix)
- void [uva::smt::bpbd::server::set\\_decoder\\_params](#) (const string &cmd, [de\\_parameters](#) &de\_params)
- bool [uva::smt::bpbd::server::process\\_input\\_cmd](#) ([server\\_parameters](#) &params, [translation\\_server](#) &server, thread &server\_thread, char command[CMD\_BUFF\_SIZE])
- void [uva::smt::bpbd::server::perform\\_command\\_loop](#) ([server\\_parameters](#) &params, [translation\\_server](#) &server, thread &server\_thread)

## 9.35 inc/server/common/models/phrase\_uid.hpp File Reference

```
#include <string>
#include <vector>
#include <stdint>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/string_utils.hpp"
#include "server/server_configs.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::common](#)
- [uva::smt::bpbd::server::common::models](#)

## 9.36 inc/server/decoder/de\_configs.hpp File Reference

```
#include <inttypes.h>
#include <stdint>
#include <string>
#include "server/server_configs.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)

### 9.37 inc/server/decoder/de\_configurator.hpp File Reference

```
#include "server/decoder/de_parameters.hpp"
#include "server/decoder/sentence/sentence_decoder.hpp"
```

#### Classes

- class [uva::smt::bpbd::server::decoder::de\\_configurator](#)

#### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)

### 9.38 inc/server/decoder/de\_parameters.hpp File Reference

```
#include <string>
#include <ostream>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/threads.hpp"
#include "server/decoder/de_configs.hpp"
```

#### Classes

- struct [uva::smt::bpbd::server::decoder::de\\_parameters\\_struct](#)

#### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)

#### Typedefs

- typedef de\_parameters\_struct [uva::smt::bpbd::server::decoder::de\\_parameters](#)

### 9.39 inc/server/decoder/sentence/sentence\_data\_map.hpp File Reference

```
#include <string>
```

```
#include <stdint>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/containers/upp_diag_matrix.hpp"
#include "server/common/models/phrase_uid.hpp"
#include "server/decoder/de_configs.hpp"
#include "server/tm/models/tm_source_entry.hpp"
```

## Classes

- struct [uva::smt::bpbd::server::decoder::sentence::phrase\\_data\\_entry](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)
- [uva::smt::bpbd::server::decoder::sentence](#)

## Typedefs

- typedef [upp\\_diag\\_matrix](#)< [phrase\\_data\\_entry](#) > [uva::smt::bpbd::server::decoder::sentence::sentence\\_data\\_map](#)

## 9.40 inc/server/decoder/sentence/sentence\_decoder.hpp File Reference

```
#include <algorithm>
#include "common/utils/threads.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/string_utils.hpp"
#include "server/common/models/phrase_uid.hpp"
#include "server/decoder/de_parameters.hpp"
#include "server/decoder/sentence/sentence_data_map.hpp"
#include "server/decoder/stack/multi_stack.hpp"
#include "server/lm/lm_configurator.hpp"
#include "server/tm/tm_configurator.hpp"
#include "server/rm/rm_configurator.hpp"
```

## Classes

- class [uva::smt::bpbd::server::decoder::sentence::sentence\\_decoder](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)

- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)
- [uva::smt::bpbd::server::decoder::sentence](#)

## 9.41 inc/server/decoder/stack/multi\_stack.hpp File Reference

```
#include <string>
#include <functional>
#include "common/utils/threads.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/lm/lm_configurator.hpp"
#include "server/rm/proxy/rm_query_proxy.hpp"
#include "server/decoder/de_configs.hpp"
#include "server/decoder/de_parameters.hpp"
#include "server/decoder/stack/stack_level.hpp"
#include "server/decoder/stack/stack_data.hpp"
```

### Classes

- class [uva::smt::bpbd::server::decoder::stack::multi\\_stack](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)
- [uva::smt::bpbd::server::decoder::stack](#)

## 9.42 inc/server/decoder/stack/stack\_data.hpp File Reference

```
#include <functional>
#include "common/utils/threads.hpp"
#include "server/decoder/sentence/sentence_data_map.hpp"
#include "server/rm/proxy/rm_query_proxy.hpp"
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
```

### Classes

- class [uva::smt::bpbd::server::decoder::stack::stack\\_state\\_tmpl< NUM\\_WORDS\\_PER\\_SENTENCE, MAX\\_X\\_HISTORY\\_LENGTH, MAX\\_M\\_GRAM\\_QUERY\\_LENGTH >](#)
- struct [uva::smt::bpbd::server::decoder::stack::stack\\_data](#)

### Namespaces

- [uva](#)
- [uva::smt](#)



- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)
- [uva::smt::bpbd::server::decoder::stack](#)

## Typedefs

- `typedef stack_state_tmpl< MAX_WORDS_PER_SENTENCE, LM_HISTORY_LEN_MAX, LM_MAX_QUERY_LEN > uva::smt::bpbd::server::decoder::stack::stack\_state`
- `typedef stack_state * uva::smt::bpbd::server::decoder::stack::stack\_state\_ptr`
- `typedef function< void(stack_state_ptr) > uva::smt::bpbd::server::decoder::stack::add\_new\_state\_function`

## 9.43 inc/server/decoder/stack/stack\_level.hpp File Reference

```
#include <string>
#include "common/utils/threads.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/decoder/de_configs.hpp"
#include "server/decoder/de_parameters.hpp"
#include "server/decoder/stack/stack_state.hpp"
```

## Classes

- [class uva::smt::bpbd::server::decoder::stack::stack\\_level](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)
- [uva::smt::bpbd::server::decoder::stack](#)

## Typedefs

- `typedef stack_level * uva::smt::bpbd::server::decoder::stack::stack\_level\_ptr`

## 9.44 inc/server/decoder/stack/stack\_state.hpp File Reference

```
#include <vector>
#include <algorithm>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/string_utils.hpp"
#include "server/lm/lm_configurator.hpp"
#include "server/rm/proxy/rm_query_proxy.hpp"
#include "server/decoder/de_configs.hpp"
#include "server/decoder/de_parameters.hpp"
#include "server/decoder/stack/state_data.hpp"
```

## Classes

- `class uva::smt::bpbd::server::decoder::stack::stack_state_tmpl< NUM_WORDS_PER_SENTENCE, MAX_X_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >`

## Namespaces

- `uva`
- `uva::smt`
- `uva::smt::bpbd`
- `uva::smt::bpbd::server`
- `uva::smt::bpbd::server::decoder`
- `uva::smt::bpbd::server::decoder::stack`

## 9.45 inc/server/decoder/stack/state\_data.hpp File Reference

```
#include <string>
#include <bitset>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/containers/circular_queue.hpp"
#include "server/tm/models/tm_target_entry.hpp"
#include "server/rm/models/rm_entry.hpp"
#include "server/decoder/stack/stack_data.hpp"
```

## Classes

- `struct uva::smt::bpbd::server::decoder::stack::state_data_tmpl< NUM_WORDS_PER_SENTENCE, MAX_X_HISTORY_LENGTH, MAX_M_GRAM_QUERY_LENGTH >`

## Namespaces

- `uva`
- `uva::smt`
- `uva::smt::bpbd`
- `uva::smt::bpbd::server`
- `uva::smt::bpbd::server::decoder`
- `uva::smt::bpbd::server::decoder::stack`

## 9.46 inc/server/lm/builders/lm\_basic\_builder.hpp File Reference

```
#include <regex>
#include "server/lm/lm_consts.hpp"
#include "server/lm/lm_parameters.hpp"
#include "common/utils/file/text_piece_reader.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::arpa::lm\\_basic\\_builder< trie\\_type, reader\\_type >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::arpa](#)

## 9.47 inc/server/lm/builders/lm\_gram\_builder.hpp File Reference

```
#include <regex>
#include <functional>
#include "server/lm/lm_consts.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/file/memory_mapped_file_reader.hpp"
#include "server/lm/lm_parameters.hpp"
#include "server/lm/mgrams/model_m_gram.hpp"
```

## Classes

- struct [uva::smt::bpbd::server::lm::arpa::TAddGramFunc< WordIndexType >](#)
- class [uva::smt::bpbd::server::lm::arpa::lm\\_gram\\_builder< WordIndexType, CURR\\_LEVEL, is\\_mult\\_weight >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::arpa](#)

## 9.48 inc/server/lm/builders/lm\_gram\_builder\_factory.hpp File Reference

```
#include <string>
#include <ios>
#include <functional>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/lm/lm_consts.hpp"
#include "server/lm/lm_configs.hpp"
#include "server/lm/lm_parameters.hpp"
#include "server/lm/builders/lm_gram_builder.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::arpa::lm\\_gram\\_builder\\_factory< TrieType >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::arpa](#)

## 9.49 inc/server/lm/dictionaries/aword\_index.hpp File Reference

```
#include <string>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/file/text_piece_reader.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::dictionary::aword\\_index](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::dictionary](#)

## 9.50 inc/server/lm/dictionaries/basic\_word\_index.hpp File Reference

```
#include <string>
#include <unordered_map>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/containers/greedy_memory_allocator.hpp"
#include "server/lm/lm_consts.hpp"
#include "server/lm/dictionaries/aword_index.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::dictionary::basic\\_word\\_index](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::dictionary](#)

## 9.51 inc/server/lm/dictionaries/counting\_word\_index.hpp File Reference

```
#include <string>
#include "basic_word_index.hpp"
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/containers/array_utils.hpp"
#include "common/utils/file/text_piece_reader.hpp"
```

## Classes

- struct [uva::smt::bpbd::server::lm::dictionary::\\_\\_counting\\_word\\_index::TWordInfo](#)
- class [uva::smt::bpbd::server::lm::dictionary::counting\\_word\\_index](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::dictionary](#)
- [uva::smt::bpbd::server::lm::dictionary::\\_\\_counting\\_word\\_index](#)

## Functions

- bool [uva::smt::bpbd::server::lm::dictionary::\\_\\_counting\\_word\\_index::operator<](#) (const TWordInfo &one, const TWordInfo &two)

## 9.52 inc/server/lm/dictionaries/hashing\_word\_index.hpp File Reference

```
#include <string>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "aword_index.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/file/text_piece_reader.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::dictionary::hashing\\_word\\_index](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::dictionary](#)

## 9.53 inc/server/lm/dictionaries/optimizing\_word\_index.hpp File Reference

```
#include <string>
#include <cstring>
#include "server/lm/lm_consts.hpp"
#include "common/utis/logging/logger.hpp"
#include "common/utis/exceptions.hpp"
#include "common/utis/math_utils.hpp"
#include "server/lm/dictionaries/aword_index.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "common/utis/containers/array_utils.hpp"
#include "common/utis/file/text_piece_reader.hpp"
```

## Classes

- struct [uva::smt::bpbd::server::lm::dictionary::\\_\\_optimizing\\_word\\_index::word\\_index\\_bucket\\_entry< word\\_id\\_type >](#)
- class [uva::smt::bpbd::server::lm::dictionary::optimizing\\_word\\_index< sub\\_word\\_index\\_type >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::dictionary](#)
- [uva::smt::bpbd::server::lm::dictionary::\\_\\_optimizing\\_word\\_index](#)

## Macros

- #define [IS\\_EQUAL](#)(token, entry) (((token).length() == (entry).m\_len) && (strcmp((token).get\_begin\_c\_str(), (entry).m\_word, (entry).m\_len) == 0))

## Typedefs

- typedef optimizing\_word\_index< basic\_word\_index > [uva::smt::bpbd::server::lm::dictionary::basic\\_↵  
optimizing\\_word\\_index](#)
- typedef optimizing\_word\_index< counting\_word\_index > [uva::smt::bpbd::server::lm::dictionary::counting\\_↵  
optimizing\\_word\\_index](#)

## Functions

- template<typename word\_id\_type >  
struct [uva::smt::bpbd::server::lm::dictionary::\\_\\_optimizing\\_word\\_index::word\\_index\\_bucket\\_entry](#) [uva::smt::↵  
:bpbd::server::lm::dictionary::\\_\\_optimizing\\_word\\_index::\\_\\_attribute\\_\\_](#) ((packed))
- [word\\_index\\_bucket\\_entry](#) ()

## Variables

- char \* [m\\_word](#)
- uint8\_t [m\\_len](#)
- word\_id\_type [m\\_word\\_id](#)

### 9.53.1 Macro Definition Documentation

- 9.53.1.1 `#define IS_EQUAL( token, entry ) (((token).length() == (entry).m_len) && (strcmp((token).get_begin_c_str(), (entry).m_word, (entry).m_len) == 0))`

Definition at line 140 of file `optimizing_word_index.hpp`.

### 9.53.2 Function Documentation

- 9.53.2.1 `__attribute__::word_index_bucket_entry ( )`

Definition at line 417 of file `optimizing_word_index.hpp`.

### 9.53.3 Variable Documentation

- 9.53.3.1 `uint8_t m_len`

Definition at line 420 of file `optimizing_word_index.hpp`.

- 9.53.3.2 `char* m_word`

Definition at line 419 of file `optimizing_word_index.hpp`.

- 9.53.3.3 `word_id_type m_word_id`

Definition at line 421 of file `optimizing_word_index.hpp`.

## 9.54 inc/server/lm/lm\_configs.hpp File Reference

```
#include <inttypes.h>
#include <string>
#include "server/server_configs.hpp"
#include "common/utils/file/cstyle_file_reader.hpp"
#include "common/utils/file/file_stream_reader.hpp"
#include "common/utils/file/memory_mapped_file_reader.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
#include "server/lm/builders/lm_basic_builder.hpp"
#include "server/lm/models/c2d_hybrid_trie.hpp"
#include "server/lm/models/c2d_map_trie.hpp"
#include "server/lm/models/c2w_array_trie.hpp"
#include "server/lm/models/g2d_map_trie.hpp"
#include "server/lm/models/h2d_map_trie.hpp"
#include "server/lm/models/w2c_array_trie.hpp"
#include "server/lm/models/w2c_hybrid_trie.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

### Typedefs

- [typedef hashing\\_word\\_index uva::smt::bpbd::server::lm::lm\\_word\\_index](#)
- [typedef h2d\\_map\\_trie< lm\\_word\\_index > uva::smt::bpbd::server::lm::lm\\_model\\_type](#)
- [typedef cstyle\\_file\\_reader uva::smt::bpbd::server::lm::lm\\_model\\_reader](#)
- [typedef lm\\_basic\\_builder< lm\\_model\\_type, lm\\_model\\_reader > uva::smt::bpbd::server::lm::lm\\_builder\\_type](#)

## 9.55 inc/server/lm/lm\_configurator.hpp File Reference

```
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/lm_parameters.hpp"
#include "server/lm/proxy/lm_proxy.hpp"
#include "server/lm/proxy/lm_proxy_local.hpp"
#include "server/lm/proxy/lm_slow_query_proxy.hpp"
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
```

### Classes

- [class uva::smt::bpbd::server::lm::lm\\_configurator](#)



## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Variables

- [class `uva::smt::bpbd::server::lm::lm\_configurator` `uva::smt::bpbd::server::lm::\_\_attribute\_\_`](#)

## 9.56 inc/server/lm/lm\_consts.hpp File Reference

```
#include <inttypes.h>
#include <string>
#include "server/server_configs.hpp"
#include "server/server_consts.hpp"
#include "common/utils/containers/dynamic_memory_arrays.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::dictionary](#)
- [uva::smt::bpbd::server::lm::dictionary::\\_\\_AWordIndex](#)
- [uva::smt::bpbd::server::lm::dictionary::\\_\\_optimizing\\_word\\_index](#)
- [uva::smt::bpbd::server::lm::identifiers](#)
- [uva::smt::bpbd::server::lm::\\_\\_C2DHybridTrie](#)
- [uva::smt::bpbd::server::lm::\\_\\_C2DMapTrie](#)
- [uva::smt::bpbd::server::lm::\\_\\_G2DMapTrie](#)
- [uva::smt::bpbd::server::lm::\\_\\_H2DMapTrie](#)
- [uva::smt::bpbd::server::lm::\\_\\_W2CArrayTrie](#)
- [uva::smt::bpbd::server::lm::\\_\\_C2WArrayTrie](#)
- [uva::smt::bpbd::server::lm::\\_\\_W2CHybridTrie](#)
- [uva::smt::bpbd::server::lm::m\\_grams](#)

## Typedefs

- [typedef `uint32\_t` `uva::smt::bpbd::server::lm::identifiers::TShortId`](#)
- [typedef `uint64\_t` `uva::smt::bpbd::server::lm::identifiers::TLongId`](#)

## 9.57 inc/server/lm/lm\_executor.hpp File Reference

```
#include <string>
#include <vector>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/lm_consts.hpp"
#include "server/lm/lm_parameters.hpp"
#include "server/lm/lm_configurator.hpp"
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
#include "server/lm/builders/lm_basic_builder.hpp"
#include "server/lm/builders/lm_gram_builder.hpp"
#include "server/lm/models/m_gram_query.hpp"
```

### Classes

- struct [uva::smt::bpbd::server::lm::\\_\\_executor::lm\\_exec\\_params](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::\\_\\_executor](#)

## 9.58 inc/server/lm/lm\_parameters.hpp File Reference

```
#include <string>
#include <ostream>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/string_utils.hpp"
#include "server/server_configs.hpp"
```

### Classes

- struct [uva::smt::bpbd::server::lm::lm\\_parameters](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## 9.59 inc/server/lm/mgrams/m\_gram\_id.hpp File Reference

```
#include <string>
#include "server/lm/lm_consts.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/math_utils.hpp"
#include "m_gram_id_tables.hpp"
```

### Classes

- struct [uva::smt::bpbd::server::lm::m\\_grams::m\\_gram\\_id::T\\_Gram\\_Id\\_Key](#)
- class [uva::smt::bpbd::server::lm::m\\_grams::m\\_gram\\_id::Byte\\_M\\_Gram\\_Id](#)< TWorldType >

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::m\\_grams](#)
- [uva::smt::bpbd::server::lm::m\\_grams::m\\_gram\\_id](#)

### Macros

- [#define N\\_GRAM\\_ID\\_TYPE\\_LEN\\_BYTES\(LEVEL\) VALUE\\_LEN\\_BYTES\(NUMBER\\_ID\\_TYPES\\_PER\\_LEVEL\[\(LEVEL\)\]\)](#)
- [#define MAX\\_N\\_GRAM\\_ID\\_LEN\\_BYTES\(LEVEL\) static\\_cast<uint8\\_t> \(\(LEVEL\) \\* NUM\\_BYTES\\_WORD\\_ID + ID\\_TYPE\\_LEN\\_BYTES\[LEVEL\]\)](#)
- [#define DECLARE\\_STACK\\_GRAM\\_ID\(type, name, level\) uint8\\_t name\[type::MAX\\_ID\\_LEN\\_BYTES\[\(level\)\]\];](#)

### Typedefs

- typedef [uint8\\_t \\* uva::smt::bpbd::server::lm::m\\_grams::m\\_gram\\_id::TM\\_Gram\\_Id\\_Value\\_Ptr](#)

#### 9.59.1 Macro Definition Documentation

9.59.1.1 [#define DECLARE\\_STACK\\_GRAM\\_ID\( type, name, level \) uint8\\_t name\[type::MAX\\_ID\\_LEN\\_BYTES\[\(level\)\]\];](#)

Definition at line 158 of file [m\\_gram\\_id.hpp](#).

9.59.1.2 [#define MAX\\_N\\_GRAM\\_ID\\_LEN\\_BYTES\( LEVEL \) static\\_cast<uint8\\_t> \(\(LEVEL\) \\* NUM\\_BYTES\\_WORD\\_ID + ID\\_TYPE\\_LEN\\_BYTES\[LEVEL\]\)](#)

Definition at line 140 of file [m\\_gram\\_id.hpp](#).

9.59.1.3 `#define N_GRAM_ID_TYPE_LEN_BYTES( LEVEL ) VALUE_LEN_BYTES(NUMBER_ID_TYPES_PER_LEVEL[(LEVEL)])`

Definition at line 122 of file `m_gram_id.hpp`.

## 9.60 `inc/server/lm/mgrams/m_gram_id_tables.hpp` File Reference

### Macros

- `#define BYTE_M_GRAM_ID_TABLES_HPP`

### 9.60.1 Macro Definition Documentation

9.60.1.1 `#define BYTE_M_GRAM_ID_TABLES_HPP`

Definition at line 28 of file `m_gram_id.hpp`.

## 9.61 `inc/server/lm/mgrams/m_gram_payload.hpp` File Reference

```
#include <string>
#include <ostream>
#include "server/lm/lm_consts.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/math_utils.hpp"
#include "server/lm/mgrams/m_gram_id.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
```

### Classes

- struct `uva::smt::bpbd::server::lm::m_grams::m_gram_payload_s`
- class `uva::smt::bpbd::server::lm::m_grams::phrase_base< MAX_PHRASE_LENGTH, MAX_PHRASE_ID_LENGTH >`

### Namespaces

- `uva`
- `uva::smt`
- `uva::smt::bpbd`
- `uva::smt::bpbd::server`
- `uva::smt::bpbd::server::lm`
- `uva::smt::bpbd::server::lm::m_grams`

### Typedefs

- typedef `m_gram_payload_s` `uva::smt::bpbd::server::lm::m_grams::m_gram_payload`

## 9.62 inc/server/lm/mgrams/model\_m\_gram.hpp File Reference

```
#include <string>
#include "server/lm/lm_consts.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/mgrams/m_gram_payload.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/math_utils.hpp"
#include "server/common/models/phrase_uid.hpp"
```

### Classes

- [class uva::smt::bpbdd::server::lm::m\\_grams::model\\_m\\_gram](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbdd](#)
- [uva::smt::bpbdd::server](#)
- [uva::smt::bpbdd::server::lm](#)
- [uva::smt::bpbdd::server::lm::m\\_grams](#)

## 9.63 inc/server/lm/mgrams/query\_m\_gram.hpp File Reference

```
#include <string>
#include "server/lm/lm_consts.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/math_utils.hpp"
#include "common/utils/exceptions.hpp"
#include "server/common/models/phrase_uid.hpp"
#include "m_gram_payload.hpp"
```

### Classes

- [class uva::smt::bpbdd::server::lm::m\\_grams::query\\_m\\_gram](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbdd](#)
- [uva::smt::bpbdd::server](#)
- [uva::smt::bpbdd::server::lm](#)
- [uva::smt::bpbdd::server::lm::m\\_grams](#)

## 9.64 inc/server/lm/models/bitmap\_hash\_cache.hpp File Reference

```
#include <stdint>
#include <bitset>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/lm/mgrams/model_m_gram.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/math_utils.hpp"
```

### Classes

- class [uva::smt::bpbd::server::lm::caching::BitmapHashCache](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::caching](#)

## 9.65 inc/server/lm/models/c2d\_hybrid\_trie.hpp File Reference

```
#include <utility>
#include <unordered_map>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "layered_trie_base.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
#include "common/utils/containers/greedy_memory_allocator.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/file/text_piece_reader.hpp"
```

### Classes

- class [uva::smt::bpbd::server::lm::c2d\\_hybrid\\_trie< WordIndexType >](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Typedefs

- typedef `c2d_hybrid_trie< basic_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieBasic`
- typedef `c2d_hybrid_trie< counting_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieCount`
- typedef `c2d_hybrid_trie< basic_optimizing_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieOptBasic`
- typedef `c2d_hybrid_trie< counting_optimizing_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieOptCount`
- typedef `c2d_hybrid_trie< hashing_word_index > uva::smt::bpbd::server::lm::TC2DHybridTrieHashing`

## 9.66 inc/server/lm/models/c2d\_map\_trie.hpp File Reference

```
#include <utility>
#include <unordered_map>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "layered_trie_base.hpp"
#include "common/utils/containers/greedy_memory_allocator.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
```

## Classes

- class `uva::smt::bpbd::server::lm::c2d_map_trie< WordIndexType >`

## Namespaces

- `uva`
- `uva::smt`
- `uva::smt::bpbd`
- `uva::smt::bpbd::server`
- `uva::smt::bpbd::server::lm`

## Typedefs

- typedef `c2d_map_trie< basic_word_index > uva::smt::bpbd::server::lm::TC2DMapTrieBasic`
- typedef `c2d_map_trie< counting_word_index > uva::smt::bpbd::server::lm::TC2DMapTrieCount`
- typedef `c2d_map_trie< hashing_word_index > uva::smt::bpbd::server::lm::TC2DMapTrieHashing`
- typedef `c2d_map_trie< basic_optimizing_word_index > uva::smt::bpbd::server::lm::TC2DMapTrieOptBasic`
- typedef `c2d_map_trie< counting_optimizing_word_index > uva::smt::bpbd::server::lm::TC2DMapTrieOptCount`

## 9.67 inc/server/lm/models/c2w\_array\_trie.hpp File Reference

```
#include <string>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "layered_trie_base.hpp"
#include "server/lm/dictionaries/aword_index.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
#include "common/utils/containers/array_utils.hpp"
```

## Classes

- struct `uva::smt::bpbd::server::lm::__C2WArrayTrie::TWordIdPBData`
- struct `uva::smt::bpbd::server::lm::__C2WArrayTrie::TCtxIdProbData`
- class `uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >`
- struct `uva::smt::bpbd::server::lm::c2w_array_trie< WordIndexType >::TSubArrReference`

## Namespaces

- `uva`
- `uva::smt`
- `uva::smt::bpbd`
- `uva::smt::bpbd::server`
- `uva::smt::bpbd::server::lm`
- `uva::smt::bpbd::server::lm::__C2WArrayTrie`

## Typedefs

- typedef `c2w_array_trie< basic_word_index > uva::smt::bpbd::server::lm::TC2WArrayTrieBasic`
- typedef `c2w_array_trie< counting_word_index > uva::smt::bpbd::server::lm::TC2WArrayTrieCount`
- typedef `c2w_array_trie< basic_optimizing_word_index > uva::smt::bpbd::server::lm::TC2WArrayTrieOpt↵ Basic`
- typedef `c2w_array_trie< counting_optimizing_word_index > uva::smt::bpbd::server::lm::TC2WArrayTrie↵ OptCount`
- typedef `c2w_array_trie< hashing_word_index > uva::smt::bpbd::server::lm::TC2WArrayTrieHashing`

## Functions

- bool `uva::smt::bpbd::server::lm::__C2WArrayTrie::operator< (const TWordIdPBData &one, const TWordId↵ PBData &two)`
- int8\_t `uva::smt::bpbd::server::lm::__C2WArrayTrie::compare (const TCtxIdProbData &one, const TCtxId↵ ProbData &two)`
- bool `uva::smt::bpbd::server::lm::__C2WArrayTrie::operator< (const TCtxIdProbData &one, const TCtxId↵ ProbData &two)`
- bool `uva::smt::bpbd::server::lm::__C2WArrayTrie::operator> (const TCtxIdProbData &one, const TCtxId↵ ProbData &two)`
- bool `uva::smt::bpbd::server::lm::__C2WArrayTrie::operator== (const TCtxIdProbData &one, const TCtxId↵ ProbData &two)`

## 9.68 inc/server/lm/models/g2d\_map\_trie.hpp File Reference

```
#include <string>
```



```
#include "server/lm/lm_consts.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/lm/dictionaries/aword_index.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
#include "server/lm/mgrams/model_m_gram.hpp"
#include "server/lm/mgrams/m_gram_id.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/containers/array_utils.hpp"
#include "common/utils/containers/fixed_size_hashmap.hpp"
#include "generic_trie_base.hpp"
#include "w2c_array_trie.hpp"
```

## Classes

- struct [uva::smt::bpbd::server::lm::\\_\\_G2DMapTrie::S\\_M\\_GramData<TPayloadType, TWordIdType>](#)
- class [uva::smt::bpbd::server::lm::g2d\\_map\\_trie<WordIndexType>](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::\\_\\_G2DMapTrie](#)

## Typedefs

- typedef [g2d\\_map\\_trie<basic\\_word\\_index>](#) [uva::smt::bpbd::server::lm::TG2DMapTrieBasic](#)
- typedef [g2d\\_map\\_trie<counting\\_word\\_index>](#) [uva::smt::bpbd::server::lm::TG2DMapTrieCount](#)
- typedef [g2d\\_map\\_trie<basic\\_optimizing\\_word\\_index>](#) [uva::smt::bpbd::server::lm::TG2DMapTrieOptBasic](#)
- typedef [g2d\\_map\\_trie<counting\\_optimizing\\_word\\_index>](#) [uva::smt::bpbd::server::lm::TG2DMapTrieOptCount](#)
- typedef [g2d\\_map\\_trie<hashing\\_word\\_index>](#) [uva::smt::bpbd::server::lm::TG2DMapTrieHashing](#)

## 9.69 inc/server/lm/models/generic\_trie\_base.hpp File Reference

```
#include <string>
#include "server/lm/lm_consts.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/lm/mgrams/model_m_gram.hpp"
#include "server/lm/mgrams/query_m_gram.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
#include "server/lm/models/m_gram_query.hpp"
#include "server/lm/models/word_index_trie_base.hpp"
#include "server/lm/models/bitmap_hash_cache.hpp"
```

## Classes

- class `uva::smt::bpbd::server::lm::generic_trie_base< TrieType, WordIndexType, BITMAP_HASH_CACHE↵_BUCKETS_FACTOR >`

## Namespaces

- `uva`
- `uva::smt`
- `uva::smt::bpbd`
- `uva::smt::bpbd::server`
- `uva::smt::bpbd::server::lm`

## Macros

- `#define REPORT_COLLISION_WARNING(gram, word_id, contextId, prevProb, prevBackOff, newProb, newBackOff)`
- `#define INSTITUTE_TRIE_FUNCS_LEVEL(LEVEL, TRIE_TYPE_NAME, ...) template void TRIE_TYP↵E_NAME<__VA_ARGS__>::add_m_gram<LEVEL>(const model_m_gram & gram);`
- `#define INSTITUTE_TRIE_TEMPLATE_TYPE(TRIE_TYPE_NAME, ...)`

## Enumerations

- enum `uva::smt::bpbd::server::lm::MGramStatusEnum` { `uva::smt::bpbd::server::lm::UNDEFINED_MGS = 0`, `uva::smt::bpbd::server::lm::BAD_END_WORD_UNKNOWN_MGS = 1`, `uva::smt::bpbd::server::lm::BAD_N↵O_PAYLOAD_MGS = 2`, `uva::smt::bpbd::server::lm::GOOD_PRESENT_MGS = 3` }

### 9.69.1 Macro Definition Documentation

- 9.69.1.1 `#define INSTITUTE_TRIE_FUNCS_LEVEL( LEVEL, TRIE_TYPE_NAME, ... ) template void TRIE_TYPE_NAME<__VA_ARGS__>::add_m_gram<LEVEL>(const model_m_gram & gram);`

Definition at line 504 of file `generic_trie_base.hpp`.

- 9.69.1.2 `#define INSTITUTE_TRIE_TEMPLATE_TYPE( TRIE_TYPE_NAME, ... )`

#### Value:

```
template class TRIE_TYPE_NAME<__VA_ARGS__>; \
 INSTITUTE_TRIE_FUNCS_LEVEL(M_GRAM_LEVEL_1, TRIE_TYPE_NAME, __VA_ARGS__); \
 INSTITUTE_TRIE_FUNCS_LEVEL(M_GRAM_LEVEL_2, TRIE_TYPE_NAME, __VA_ARGS__); \
 INSTITUTE_TRIE_FUNCS_LEVEL(M_GRAM_LEVEL_3, TRIE_TYPE_NAME, __VA_ARGS__); \
 INSTITUTE_TRIE_FUNCS_LEVEL(M_GRAM_LEVEL_4, TRIE_TYPE_NAME, __VA_ARGS__); \
 INSTITUTE_TRIE_FUNCS_LEVEL(M_GRAM_LEVEL_5, TRIE_TYPE_NAME, __VA_ARGS__); \
 INSTITUTE_TRIE_FUNCS_LEVEL(M_GRAM_LEVEL_6, TRIE_TYPE_NAME, __VA_ARGS__); \
 INSTITUTE_TRIE_FUNCS_LEVEL(M_GRAM_LEVEL_7, TRIE_TYPE_NAME, __VA_ARGS__);
```

Definition at line 507 of file `generic_trie_base.hpp`.

- 9.69.1.3 `#define REPORT_COLLISION_WARNING( gram, word_id, contextId, prevProb, prevBackOff, newProb, newBackOff )`

#### Value:

```

LOG_WARNING << "The " << gram.get_m_gram_level() << "-Gram : " << (string) gram
 << " has been already seen! Word Id: " << SSTR(word_id)
 \
 << ", context Id: " << SSTR(contextId) << ". "
 \
 << "Changing the (prob,back-off) data from ("
 << prevProb << "," << prevBackOff << ") to ("
 << newProb << "," << newBackOff << ") " << END_LOG;

```

Definition at line 64 of file generic\_trie\_base.hpp.

## 9.70 inc/server/lm/models/h2d\_map\_trie.hpp File Reference

```

#include <string>
#include "server/lm/lm_consts.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/dictionaries/aword_index.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
#include "server/lm/mgrams/model_m_gram.hpp"
#include "server/lm/mgrams/m_gram_id.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/containers/array_utils.hpp"
#include "common/utils/containers/fixed_size_hashmap.hpp"
#include "generic_trie_base.hpp"

```

### Classes

- struct [uva::smt::bpbd::server::lm::\\_\\_H2DMapTrie::S\\_M\\_GramData< TPayloadType >](#)
- class [uva::smt::bpbd::server::lm::h2d\\_map\\_trie< WordIndexType >](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::\\_\\_H2DMapTrie](#)

### Typedefs

- typedef [h2d\\_map\\_trie< basic\\_word\\_index >](#) [uva::smt::bpbd::server::lm::TH2DMapTrieBasic](#)
- typedef [h2d\\_map\\_trie< counting\\_word\\_index >](#) [uva::smt::bpbd::server::lm::TH2DMapTrieCount](#)
- typedef [h2d\\_map\\_trie< basic\\_optimizing\\_word\\_index >](#) [uva::smt::bpbd::server::lm::TH2DMapTrieOptBasic](#)
- typedef [h2d\\_map\\_trie< counting\\_optimizing\\_word\\_index >](#) [uva::smt::bpbd::server::lm::TH2DMapTrieOptCount](#)
- typedef [h2d\\_map\\_trie< hashing\\_word\\_index >](#) [uva::smt::bpbd::server::lm::TH2DMapTrieHashing](#)

## 9.71 inc/server/lm/models/layered\_trie\_base.hpp File Reference

```

#include <string>

```

```
#include <cstring>
#include "server/lm/lm_consts.hpp"
#include "common/utis/exceptions.hpp"
#include "common/utis/logging/logger.hpp"
#include "common/utis/file/text_piece_reader.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
#include "server/lm/models/generic_trie_base.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::layered\\_trie\\_base< TrieType, WordIndexType, BITMAP\\_HASH\\_CACHE↵\\_BUCKETS\\_FACTOR >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::\\_\\_LayeredTrieBase](#)

## Macros

- [#define LAYERED\\_BASE\\_ENSURE\\_CONTEXT\(query, status\)](#)
- [#define INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE\(CLASS\\_NAME, WORD\\_IDX\\_TYP↵E\) template class CLASS\\_NAME<WORD\\_IDX\\_TYPE >;](#)

## Functions

- [template<typename TrieType , phrase\\_length CURR\\_LEVEL, bool GET\\_BACK\\_OFF\\_CTX\\_ID, debug\\_levels\\_enum LOG\\_LEVEL = debug\\_levels\\_enum::DEBUG1>](#)  
[phrase\\_length uva::smt::bpbd::server::lm::\\_\\_LayeredTrieBase::search\\_m\\_gram\\_ctx\\_id \(const TrieType &trie, const word\\_uid \\*const word\\_ids, TLongId &prev\\_ctx\\_id, TLongId &ctx\\_id\)](#)
- [template<typename TrieType , phrase\\_length CURR\\_LEVEL, debug\\_levels\\_enum LOG\\_LEVEL>](#)  
[void uva::smt::bpbd::server::lm::\\_\\_LayeredTrieBase::get\\_context\\_id \(TrieType &trie, const model\\_m\\_gram &gram, TLongId &ctx\\_id\)](#)

### 9.71.1 Macro Definition Documentation

- 9.71.1.1 [#define INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE\( CLASS\\_NAME, WORD\\_IDX\\_TYPE \) template class CLASS\\_NAME<WORD\\_IDX\\_TYPE >;](#)

Definition at line 315 of file `layered_trie_base.hpp`.

- 9.71.1.2 [#define LAYERED\\_BASE\\_ENSURE\\_CONTEXT\( query, status \)](#)

#### Value:

```

if (query.get_curr_ctx_ref() == UNDEFINED_WORD_ID) { \
 BASE::ensure_context(query, status); \
} else { \
 status = MGramStatusEnum::GOOD_PRESENT_MGS; \
}

```

Definition at line 142 of file layered\_trie\_base.hpp.

## 9.72 inc/server/lm/models/m\_gram\_query.hpp File Reference

```

#include <string>
#include <ostream>
#include <algorithm>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/server_configs.hpp"
#include "server/lm/lm_consts.hpp"
#include "server/lm/mgrams/query_m_gram.hpp"

```

### Classes

- class [uva::smt::bpbd::server::lm::m\\_gram\\_query](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## 9.73 inc/server/lm/models/w2c\_array\_trie.hpp File Reference

```

#include <string>
#include <cstdlib>
#include <cmath>
#include <algorithm>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "layered_trie_base.hpp"
#include "server/lm/dictionaries/aword_index.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
#include "common/utils/containers/array_utils.hpp"
#include "common/utils/containers/dynamic_memory_arrays.hpp"

```

### Classes

- struct [uva::smt::bpbd::server::lm::\\_\\_W2CArrayTrie::S\\_M\\_GramData< PAYLOAD\\_TYPE >](#)
- class [uva::smt::bpbd::server::lm::w2c\\_array\\_trie< WordIndexType >](#)
- class [uva::smt::bpbd::server::lm::w2c\\_array\\_trie< WordIndexType >::WordDataEntry< ARRAY\\_ELEM\\_T, PAYLOAD\\_TYPE >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::\\_\\_W2CArryTrie](#)

## Typedefs

- [typedef S\\_M\\_GramData< m\\_gram\\_payload > uva::smt::bpbd::server::lm::\\_\\_W2CArryTrie::T\\_M\\_GramData](#)
- [typedef S\\_M\\_GramData< prob\\_weight > uva::smt::bpbd::server::lm::\\_\\_W2CArryTrie::T\\_N\\_GramData](#)
- [typedef w2c\\_array\\_trie< basic\\_word\\_index > uva::smt::bpbd::server::lm::TW2CArryTrieBasic](#)
- [typedef w2c\\_array\\_trie< counting\\_word\\_index > uva::smt::bpbd::server::lm::TW2CArryTrieCount](#)
- [typedef w2c\\_array\\_trie< basic\\_optimizing\\_word\\_index > uva::smt::bpbd::server::lm::TW2CArryTrieOptBasic](#)
- [typedef w2c\\_array\\_trie< counting\\_optimizing\\_word\\_index > uva::smt::bpbd::server::lm::TW2CArryTrieOptCount](#)
- [typedef w2c\\_array\\_trie< hashing\\_word\\_index > uva::smt::bpbd::server::lm::TW2CArryTrieHashing](#)

## Functions

- [bool uva::smt::bpbd::server::lm::\\_\\_W2CArryTrie::operator< \(const T\\_M\\_GramData &one, const T\\_M\\_GramData &two\)](#)
- [bool uva::smt::bpbd::server::lm::\\_\\_W2CArryTrie::operator< \(const T\\_N\\_GramData &one, const T\\_N\\_GramData &two\)](#)

## 9.74 inc/server/lm/models/w2c\_hybrid\_trie.hpp File Reference

```
#include <string>
#include "server/lm/lm_consts.hpp"
#include "common/utis/logging/logger.hpp"
#include "layered_trie_base.hpp"
#include "server/lm/dictionaries/aword_index.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
#include "server/lm/models/w2ch_um_storage.hpp"
```

## Classes

- [class uva::smt::bpbd::server::lm::w2c\\_hybrid\\_trie< WordIndexType, StorageFactory, StorageContainer >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Typedefs

- typedef [w2c\\_hybrid\\_trie](#)< [basic\\_word\\_index](#) > [uva::smt::bpbd::server::lm::TW2CHybridTrieBasic](#)
- typedef [w2c\\_hybrid\\_trie](#)< [counting\\_word\\_index](#) > [uva::smt::bpbd::server::lm::TW2CHybridTrieCount](#)
- typedef [w2c\\_hybrid\\_trie](#)< [basic\\_optimizing\\_word\\_index](#) > [uva::smt::bpbd::server::lm::TW2CHybridTrie](#)↵  
[OptBasic](#)
- typedef [w2c\\_hybrid\\_trie](#)< [counting\\_optimizing\\_word\\_index](#) > [uva::smt::bpbd::server::lm::TW2CHybridTrie](#)↵  
[OptCount](#)
- typedef [w2c\\_hybrid\\_trie](#)< [hashing\\_word\\_index](#) > [uva::smt::bpbd::server::lm::TW2CHybridTrieHashing](#)

## 9.75 inc/server/lm/models/w2ch\_um\_storage.hpp File Reference

```
#include <inttypes.h>
#include <utility>
#include <unordered_map>
#include <map>
#include "server/lm/lm_consts.hpp"
#include "common/utis/logging/logger.hpp"
#include "server/lm/dictionaries/aword_index.hpp"
#include "common/utis/containers/greedy_memory_allocator.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::W2CH\\_UM\\_Storage](#)
- class [uva::smt::bpbd::server::lm::W2CH\\_UM\\_StorageFactory](#)< N >

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Typedefs

- typedef pair< const [TShortId](#), [TShortId](#) > [uva::smt::bpbd::server::lm::TStorageMapEntry](#)
- typedef [greedy\\_memory\\_allocator](#)< [TStorageMapEntry](#) > [uva::smt::bpbd::server::lm::TStorageMap](#)↵  
[Allocator](#)
- typedef unordered\_map< [TShortId](#), [TShortId](#), std::hash< [TShortId](#) >, std::equal\_to< [TShortId](#) >, [T](#)↵  
[StorageMapAllocator](#) > [uva::smt::bpbd::server::lm::TStorageUnsignedMap](#)
- typedef map< [TShortId](#), [TShortId](#) > [uva::smt::bpbd::server::lm::TStorageMap](#)

## 9.76 inc/server/lm/models/word\_index\_trie\_base.hpp File Reference

```
#include <string>
```

```
#include "server/lm/lm_consts.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::word\\_index\\_trie\\_base< WordIndex >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## 9.77 inc/server/lm/proxy/lm\_fast\_query\_proxy.hpp File Reference

```
#include "common/utils/file/text_piece_reader.hpp"
#include "server/server_configs.hpp"
#include "server/lm/lm_consts.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::proxy](#)

## 9.78 inc/server/lm/proxy/lm\_fast\_query\_proxy\_local.hpp File Reference

```
#include <algorithm>
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
#include "server/lm/models/m_gram_query.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::proxy::lm\\_fast\\_query\\_proxy\\_local< trie\\_type >](#)



## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::proxy](#)

## 9.79 inc/server/lm/proxy/lm\_proxy.hpp File Reference

```
#include "server/lm/proxy/lm_slow_query_proxy.hpp"
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::proxy::lm\\_proxy](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::proxy](#)

## 9.80 inc/server/lm/proxy/lm\_proxy\_local.hpp File Reference

```
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/monitor/statistics_monitor.hpp"
#include "server/server_configs.hpp"
#include "server/lm/lm_configs.hpp"
#include "server/lm/lm_consts.hpp"
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
#include "server/lm/proxy/lm_fast_query_proxy_local.hpp"
#include "server/lm/proxy/lm_slow_query_proxy.hpp"
#include "server/lm/proxy/lm_slow_query_proxy_local.hpp"
#include "server/lm/builders/lm_basic_builder.hpp"
```

## Classes

- class [uva::smt::bpbd::server::lm::proxy::lm\\_proxy\\_local](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::proxy](#)

## 9.81 inc/server/lm/proxy/lm\_slow\_query\_proxy.hpp File Reference

```
#include "common/utils/file/text_piece_reader.hpp"
#include "server/server_configs.hpp"
#include "server/lm/lm_consts.hpp"
```

## Classes

- [class uva::smt::bpbd::server::lm::proxy::lm\\_slow\\_query\\_proxy](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::proxy](#)

## 9.82 inc/server/lm/proxy/lm\_slow\_query\_proxy\_local.hpp File Reference

```
#include <string>
#include "server/lm/proxy/lm_slow_query_proxy.hpp"
#include "server/lm/models/m_gram_query.hpp"
```

## Classes

- [class uva::smt::bpbd::server::lm::proxy::lm\\_slow\\_query\\_proxy\\_local< trie\\_type >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::proxy](#)

## 9.83 inc/server/rm/builders/rm\_basic\_builder.hpp File Reference

```
#include <cmath>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/string_utils.hpp"
#include "server/tm/tm_configurator.hpp"
#include "server/tm/proxy/tm_query_proxy.hpp"
#include "server/common/models/phrase_uid.hpp"
#include "server/rm/rm_parameters.hpp"
#include "server/rm/models/rm_entry.hpp"
```

### Classes

- class [uva::smt::bpbd::server::rm::builders::rm\\_basic\\_builder< model\\_type, reader\\_type >](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)
- [uva::smt::bpbd::server::rm::builders](#)

## 9.84 inc/server/rm/models/rm\_basic\_model.hpp File Reference

```
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/rm/rm_consts.hpp"
#include "server/rm/models/rm_entry.hpp"
#include "server/rm/models/rm_query.hpp"
#include "common/utils/containers/fixed_size_hashmap.hpp"
```

### Classes

- class [uva::smt::bpbd::server::rm::models::rm\\_basic\\_model](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)
- [uva::smt::bpbd::server::rm::models](#)

## 9.85 inc/server/rm/models/rm\_entry.hpp File Reference

```
#include <string>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/common/models/phrase_uid.hpp"
```

### Classes

- class [uva::smt::bpbd::server::rm::models::rm\\_entry\\_temp< num\\_features >](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)
- [uva::smt::bpbd::server::rm::models](#)

### Typedefs

- typedef [rm\\_entry\\_temp< NUM\\_RM\\_FEATURES >](#) [uva::smt::bpbd::server::rm::models::rm\\_entry](#)

### Enumerations

- enum [uva::smt::bpbd::server::rm::models::reordering\\_orientation](#) {  
[uva::smt::bpbd::server::rm::models::UNKNOWN\\_ORIENT](#) = 0, [uva::smt::bpbd::server::rm::models::MONO←](#)  
[TONE\\_ORIENT](#) = [UNKNOWN\\_ORIENT](#) + 1, [uva::smt::bpbd::server::rm::models::SWAP\\_ORIENT](#) = MON←  
[OTONE\\_ORIENT](#) + 1, [uva::smt::bpbd::server::rm::models::DISCONT\\_LEFT\\_ORIENT](#) = [SWAP\\_ORIENT](#) +  
1,  
[uva::smt::bpbd::server::rm::models::DISCONT\\_RIGHT\\_ORIENT](#) = [DISCONT\\_LEFT\\_ORIENT](#) + 1, [uva←](#)  
[::smt::bpbd::server::rm::models::size](#) = [DISCONT\\_RIGHT\\_ORIENT](#) + 1 }

## 9.86 inc/server/rm/models/rm\_query.hpp File Reference

```
#include <string>
#include <unordered_map>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/rm/models/rm_entry.hpp"
```

### Classes

- class [uva::smt::bpbd::server::rm::models::rm\\_query< model\\_type >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)
- [uva::smt::bpbd::server::rm::models](#)

## 9.87 inc/server/rm/proxy/rm\_proxy.hpp File Reference

```
#include "server/rm/proxy/rm_query_proxy.hpp"
```

## Classes

- class [uva::smt::bpbd::server::rm::proxy::rm\\_proxy](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)
- [uva::smt::bpbd::server::rm::proxy](#)

## 9.88 inc/server/rm/proxy/rm\_proxy\_local.hpp File Reference

```
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/monitor/statistics_monitor.hpp"
#include "server/server_configs.hpp"
#include "server/rm/rm_configs.hpp"
#include "server/rm/proxy/rm_query_proxy.hpp"
#include "server/rm/proxy/rm_query_proxy_local.hpp"
```

## Classes

- class [uva::smt::bpbd::server::rm::proxy::rm\\_proxy\\_local](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)
- [uva::smt::bpbd::server::rm::proxy](#)

## 9.89 inc/server/rm/proxy/rm\_query\_proxy.hpp File Reference

```
#include <vector>
#include "server/common/models/phrase_uid.hpp"
#include "server/rm/models/rm_entry.hpp"
```

### Classes

- class [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)
- [uva::smt::bpbd::server::rm::proxy](#)

## 9.90 inc/server/rm/proxy/rm\_query\_proxy\_local.hpp File Reference

```
#include "server/rm/proxy/rm_query_proxy.hpp"
#include "server/rm/models/rm_entry.hpp"
#include "server/rm/models/rm_query.hpp"
```

### Classes

- class [uva::smt::bpbd::server::rm::proxy::rm\\_query\\_proxy\\_local< model\\_type >](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)
- [uva::smt::bpbd::server::rm::proxy](#)

## 9.91 inc/server/rm/rm\_configs.hpp File Reference

```
#include "server/server_configs.hpp"
#include "common/utils/file/cstyle_file_reader.hpp"
#include "common/utils/file/file_stream_reader.hpp"
#include "common/utils/file/memory_mapped_file_reader.hpp"
#include "server/rm/models/rm_basic_model.hpp"
#include "server/rm/builders/rm_basic_builder.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)

## Typedefs

- typedef [rm\\_basic\\_model](#) [uva::smt::bpbd::server::rm::rm\\_model\\_type](#)
- typedef [cstyle\\_file\\_reader](#) [uva::smt::bpbd::server::rm::rm\\_model\\_reader](#)
- typedef [rm\\_basic\\_builder](#) < [rm\\_model\\_type](#), [rm\\_model\\_reader](#) > [uva::smt::bpbd::server::rm::rm\\_builder\\_type](#)

## 9.92 inc/server/rm/rm\_configurator.hpp File Reference

```
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/rm/rm_parameters.hpp"
#include "server/rm/proxy/rm_proxy.hpp"
#include "server/rm/proxy/rm_proxy_local.hpp"
#include "server/rm/proxy/rm_query_proxy.hpp"
```

## Classes

- class [uva::smt::bpbd::server::rm::rm\\_configurator](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)

## 9.93 inc/server/rm/rm\_consts.hpp File Reference

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)
- [uva::smt::bpbd::server::rm::models](#)
- [uva::smt::bpbd::server::rm::models::\\_\\_rm\\_basic\\_model](#)

## 9.94 inc/server/rm/rm\_parameters.hpp File Reference

```
#include <string>
#include <ostream>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/string_utils.hpp"
#include "server/server_configs.hpp"
```

### Classes

- struct [uva::smt::bpbd::server::rm::rm\\_parameters](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)

## 9.95 inc/server/server\_configs.hpp File Reference

```
#include "server_consts.hpp"
#include <string>
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::rm](#)

### Macros

- `#define` [SERVER\\_CONFIGS\\_HPP](#)

### Variables

- const prob\_weight [uva::smt::bpbd::server::lm::DEF\\_UNK\\_WORD\\_LOG\\_PROB\\_WEIGHT](#) = -10.0f

### 9.95.1 Macro Definition Documentation

#### 9.95.1.1 #define SERVER\_CONFIGS\_HPP

Definition at line 29 of file server\_configs.hpp.



## 9.96 inc/server/server\_consts.hpp File Reference

```
#include <string>
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::rm](#)

### Typedefs

- typedef uint16\_t [uva::smt::bpbd::server::phrase\\_length](#)
- typedef float [uva::smt::bpbd::server::prob\\_weight](#)
- typedef uint64\_t [uva::smt::bpbd::server::phrase\\_uid](#)
- typedef uint64\_t [uva::smt::bpbd::server::word\\_uid](#)

## 9.97 inc/server/server\_parameters.hpp File Reference

```
#include <string>
#include <ostream>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "decoder/de_parameters.hpp"
#include "lm/lm_parameters.hpp"
#include "rm/rm_parameters.hpp"
#include "tm/tm_parameters.hpp"
```

### Classes

- struct [uva::smt::bpbd::server::server\\_parameters](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

## 9.98 inc/server/tm/builders/tm\_basic\_builder.hpp File Reference

```
#include <cmath>
#include <unordered_map>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/string_utils.hpp"
#include "server/server_consts.hpp"
#include "server/common/models/phrase_uid.hpp"
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
#include "server/lm/lm_configurator.hpp"
#include "server/tm/tm_parameters.hpp"
#include "server/tm/models/tm_target_entry.hpp"
#include "server/tm/models/tm_source_entry.hpp"
```

### Classes

- class [uva::smt::bpbd::server::tm::builders::tm\\_basic\\_builder< model\\_type, reader\\_type >](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::builders](#)

### Typedefs

- typedef unordered\_map< phrase\_uid, size\_t > [uva::smt::bpbd::server::tm::builders::sizes\\_map](#)

## 9.99 inc/server/tm/models/tm\_basic\_model.hpp File Reference

```
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
#include "server/tm/tm_consts.hpp"
#include "server/tm/models/tm_source_entry.hpp"
#include "server/tm/models/tm_query.hpp"
#include "common/utils/containers/fixed_size_hashmap.hpp"
```

### Classes

- class [uva::smt::bpbd::server::tm::models::tm\\_basic\\_model](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::models](#)

## 9.100 inc/server/tm/models/tm\_query.hpp File Reference

```
#include <string>
#include <unordered_map>
#include <vector>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "server/tm/models/tm_source_entry.hpp"
```

## Classes

- class [uva::smt::bpbd::server::tm::models::tm\\_query< model\\_type >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::models](#)

## 9.101 inc/server/tm/models/tm\_source\_entry.hpp File Reference

```
#include <string>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/containers/fixed_size_hashmap.hpp"
#include "server/common/models/phrase_uid.hpp"
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
#include "server/tm/models/tm_target_entry.hpp"
```

## Classes

- class [uva::smt::bpbd::server::tm::models::tm\\_source\\_entry](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::models](#)

## Typedefs

- `typedef const tm_source_entry uva::smt::bpbd::server::tm::models::tm\_const\_source\_entry`
- `typedef tm_const_source_entry * uva::smt::bpbd::server::tm::models::tm\_const\_source\_entry\_ptr`
- `typedef tm_source_entry * uva::smt::bpbd::server::tm::models::tm\_source\_entry\_ptr`

## 9.102 inc/server/tm/models/tm\_target\_entry.hpp File Reference

```
#include <cstring>
#include <string>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/hashing_utils.hpp"
#include "server/lm/proxy/lm_fast_query_proxy.hpp"
#include "server/common/models/phrase_uid.hpp"
```

## Classes

- `class uva::smt::bpbd::server::tm::models::tm\_target\_entry\_temp< max_num_features >`

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::models](#)

## Typedefs

- `typedef tm_target_entry_temp< NUM_TM_FEATURES > uva::smt::bpbd::server::tm::models::tm\_target\_entry`
- `typedef const tm_target_entry uva::smt::bpbd::server::tm::models::tm\_const\_target\_entry`
- `typedef prob_weight uva::smt::bpbd::server::tm::models::feature\_array[tm_target_entry::NUM_FEATURES]`

## 9.103 inc/server/tm/proxy/tm\_proxy.hpp File Reference

```
#include "server/tm/proxy/tm_query_proxy.hpp"
```

## Classes

- class [uva::smt::bpbd::server::tm::proxy::tm\\_proxy](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::proxy](#)

## 9.104 inc/server/tm/proxy/tm\_proxy\_local.hpp File Reference

```
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/monitor/statistics_monitor.hpp"
#include "server/tm/tm_configs.hpp"
#include "server/tm/proxy/tm_query_proxy.hpp"
#include "server/tm/proxy/tm_query_proxy_local.hpp"
#include "server/tm/builders/tm_basic_builder.hpp"
```

## Classes

- class [uva::smt::bpbd::server::tm::proxy::tm\\_proxy\\_local](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::proxy](#)

## 9.105 inc/server/tm/proxy/tm\_query\_proxy.hpp File Reference

```
#include "server/tm/tm_configs.hpp"
#include "server/tm/models/tm_source_entry.hpp"
```

## Classes

- class [uva::smt::bpbd::server::tm::proxy::tm\\_query\\_proxy](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::proxy](#)

### 9.106 inc/server/tm/proxy/tm\_query\_proxy\_local.hpp File Reference

```
#include "server/tm/proxy/tm_query_proxy.hpp"
#include "server/tm/models/tm_query.hpp"
```

## Classes

- [class uva::smt::bpbd::server::tm::proxy::tm\\_query\\_proxy\\_local< model\\_type >](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::proxy](#)

### 9.107 inc/server/tm/tm\_configs.hpp File Reference

```
#include "server/server_configs.hpp"
#include "common/utils/file/cstyle_file_reader.hpp"
#include "common/utils/file/file_stream_reader.hpp"
#include "common/utils/file/memory_mapped_file_reader.hpp"
#include "server/tm/models/tm_basic_model.hpp"
#include "server/tm/builders/tm_basic_builder.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)

## Typedefs

- [typedef tm\\_basic\\_model uva::smt::bpbd::server::tm::tm\\_model\\_type](#)
- [typedef cstyle\\_file\\_reader uva::smt::bpbd::server::tm::tm\\_model\\_reader](#)
- [typedef tm\\_basic\\_builder< tm\\_model\\_type, tm\\_model\\_reader > uva::smt::bpbd::server::tm::tm\\_builder\\_type](#)

## 9.108 inc/server/tm/tm\_configurator.hpp File Reference

```
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/tm/tm_parameters.hpp"
#include "server/tm/proxy/tm_proxy.hpp"
#include "server/tm/proxy/tm_proxy_local.hpp"
#include "server/tm/proxy/tm_query_proxy.hpp"
```

### Classes

- class [uva::smt::bpbd::server::tm::tm\\_configurator](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)

## 9.109 inc/server/tm/tm\_consts.hpp File Reference

```
#include <string>
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::models](#)
- [uva::smt::bpbd::server::tm::models::\\_\\_tm\\_basic\\_model](#)

## 9.110 inc/server/tm/tm\_parameters.hpp File Reference

```
#include <string>
#include <ostream>
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/string_utils.hpp"
#include "server/server_configs.hpp"
```

### Classes

- struct [uva::smt::bpbd::server::tm::tm\\_parameters](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)

### 9.111 inc/server/trans\_job\_pool.hpp File Reference

```
#include <map>
#include <vector>
#include <websocketpp/server.hpp>
#include "trans_task_pool.hpp"
#include "common/messaging/trans_session_id.hpp"
#include "common/messaging/trans_job_id.hpp"
#include "common/messaging/trans_job_request.hpp"
#include "common/utils/threads.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "trans_task_id.hpp"
#include "trans_job.hpp"
```

## Classes

- class [uva::smt::bpbd::server::trans\\_job\\_pool](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

## Macros

- `#define` [TRANS\\_JOB\\_POOL\\_HPP](#)

### 9.111.1 Macro Definition Documentation

#### 9.111.1.1 `#define` TRANS\_JOB\_POOL\_HPP

Definition at line 51 of file trans\_job\_pool.hpp.



## 9.112 inc/server/trans\_task.hpp File Reference

```
#include "common/utils/threads.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/messaging/trans_session_id.hpp"
#include "common/messaging/trans_job_id.hpp"
#include "common/messaging/trans_job_code.hpp"
#include "trans_task_id.hpp"
#include "server/decoder/de_configurator.hpp"
#include "server/decoder/sentence/sentence_decoder.hpp"
```

### Classes

- class [uva::smt::bpbd::server::trans\\_task](#)

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

### Typedefs

- typedef trans\_task \* [uva::smt::bpbd::server::trans\\_task\\_ptr](#)

## 9.113 inc/server/trans\_task\_id.hpp File Reference

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::task\\_id](#)

### Typedefs

- typedef uint64\_t [uva::smt::bpbd::server::task\\_id\\_type](#)

## 9.114 inc/server/trans\_task\_pool.hpp File Reference

```
#include <vector>
#include <deque>
#include "trans_task.hpp"
#include "common/utils/threads.hpp"
#include "server/trans_task_pool_worker.hpp"
```

## Classes

- class [uva::smt::bpbd::server::trans\\_task\\_pool](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

## 9.115 inc/server/trans\_task\_pool\_worker.hpp File Reference

```
#include "trans_task.hpp"
#include "common/utils/threads.hpp"
```

## Classes

- class [uva::smt::bpbd::server::trans\\_task\\_pool\\_worker](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

## 9.116 inc/server/translation\_server.hpp File Reference

```
#include <iostream>
#include <functional>
#include <websocketpp/config/asio_no_tls.hpp>
#include <websocketpp/server.hpp>
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/messaging/trans_job_response.hpp"
#include "common/messaging/trans_job_request.hpp"
#include "common/messaging/trans_job_code.hpp"
#include "trans_manager.hpp"
```

## Classes

- class [uva::smt::bpbd::server::translation\\_server](#)

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

## Macros

- `#define ASIO_STANDALONE`

### 9.116.1 Macro Definition Documentation

#### 9.116.1.1 `#define ASIO_STANDALONE`

Definition at line 32 of file `translation_server.hpp`.

## 9.117 README.md File Reference

### 9.118 `src/client/bpbd_client.cpp` File Reference

```
#include <string>
#include "tclap/CmdLine.h"
#include "main.hpp"
#include "client/client_config.hpp"
#include "client/trans_manager.hpp"
#include "common/utils/exceptions.hpp"
```

## Macros

- `#define PROGRAM_VERSION_STR "1.0"`

## Functions

- void `create_arguments_parser` ()
- void `destroy_arguments_parser` ()
- int `main` (int argc, char \*\*argv)

### 9.118.1 Macro Definition Documentation

#### 9.118.1.1 `#define PROGRAM_VERSION_STR "1.0"`

Definition at line 48 of file `bpbd_client.cpp`.

### 9.118.2 Function Documentation

#### 9.118.2.1 void `create_arguments_parser` ( )

Creates and sets up the command line parameters parser

Definition at line 75 of file `bpbd_client.cpp`.

#### 9.118.2.2 void `destroy_arguments_parser` ( )

Allows to deallocate the parameters parser if it is needed

Definition at line 115 of file `bpbd_client.cpp`.

9.118.2.3 `int main ( int argc, char ** argv )`

The main program entry point

Definition at line 171 of file `bpbd_client.cpp`.

## 9.119 `src/client/trans_job_status.cpp` File Reference

```
#include "client/trans_job_status.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::client](#)

### Macros

- `#define STATUS_UNKNOWN_STR "unknown"`
- `#define STATUS_UNDEFINED_STR "undefined"`
- `#define STATUS_REQ_INITIALIZED_STR "not-sent"`
- `#define STATUS_REQ_SENT_GOOD_STR "not-replied"`
- `#define STATUS_REQ_SENT_FAIL_STR "send-failed"`
- `#define STATUS_RES_RECEIVED_STR "replied"`

### Functions

- `ostream & uva::smt::bpbd::client::operator<< (ostream &os, const trans_job_status &status)`

#### 9.119.1 Macro Definition Documentation

9.119.1.1 `#define STATUS_REQ_INITIALIZED_STR "not-sent"`

Definition at line 36 of file `trans_job_status.cpp`.

9.119.1.2 `#define STATUS_REQ_SENT_FAIL_STR "send-failed"`

Definition at line 38 of file `trans_job_status.cpp`.

9.119.1.3 `#define STATUS_REQ_SENT_GOOD_STR "not-replied"`

Definition at line 37 of file `trans_job_status.cpp`.

9.119.1.4 `#define STATUS_RES_RECEIVED_STR "replied"`

Definition at line 39 of file `trans_job_status.cpp`.

#### 9.119.1.5 `#define STATUS_UNDEFINED_STR "undefined"`

Definition at line 35 of file trans\_job\_status.cpp.

#### 9.119.1.6 `#define STATUS_UNKNOWN_STR "unknown"`

Definition at line 34 of file trans\_job\_status.cpp.

## 9.120 src/common/messaging/trans\_job\_code.cpp File Reference

```
#include "common/messaging/trans_job_code.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::common](#)
- [uva::smt::bpbd::common::messaging](#)

### Macros

- `#define` [RESULT\\_UNKNOWN\\_STR](#) "unknown"
- `#define` [RESULT\\_UNDEFINED\\_STR](#) "undefined"
- `#define` [RESULT\\_OK\\_STR](#) "good"
- `#define` [RESULT\\_ERROR\\_STR](#) "error"
- `#define` [RESULT\\_CANCELED\\_STR](#) "canceled"
- `#define` [RESULT\\_PARTIAL\\_STR](#) "partial"

### Functions

- ostream & [uva::smt::bpbd::common::messaging::operator<<](#) (ostream &os, const trans\_job\_code &code)

### 9.120.1 Macro Definition Documentation

#### 9.120.1.1 `#define RESULT_CANCELED_STR "canceled"`

Definition at line 39 of file trans\_job\_code.cpp.

#### 9.120.1.2 `#define RESULT_ERROR_STR "error"`

Definition at line 38 of file trans\_job\_code.cpp.

#### 9.120.1.3 `#define RESULT_OK_STR "good"`

Definition at line 37 of file trans\_job\_code.cpp.

#### 9.120.1.4 `#define RESULT_PARTIAL_STR "partial"`

Definition at line 40 of file `trans_job_code.cpp`.

#### 9.120.1.5 `#define RESULT_UNDEFINED_STR "undefined"`

Definition at line 36 of file `trans_job_code.cpp`.

#### 9.120.1.6 `#define RESULT_UNKNOWN_STR "unknown"`

Definition at line 35 of file `trans_job_code.cpp`.

## 9.121 `src/common/utils/logging/logger.cpp` File Reference

```
#include <algorithm>
#include "common/utils/logging/logger.hpp"
#include "common/utils/monitor/statistics_monitor.hpp"
```

### Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::logging](#)

### Macros

- `#define IS_ENOUGH_LOGGING_LEVEL(level) (( PROGRESS_ACTIVE_LEVEL <= LOGER_M_GRAM_LEVEL_MAX ) && ( PROGRESS_ACTIVE_LEVEL <= level ))`

### Functions

- `std::ostream & uva::utils::logging::operator<< (std::ostream &stream, const unsigned char &value)`
- `std::ostream & uva::utils::logging::operator<< (std::ostream &stream, const signed char &value)`

#### 9.121.1 Macro Definition Documentation

##### 9.121.1.1 `#define IS_ENOUGH_LOGGING_LEVEL( level ) (( PROGRESS_ACTIVE_LEVEL <= LOGER_M_GRAM_LEVEL_MAX ) && ( PROGRESS_ACTIVE_LEVEL <= level ))`

Definition at line 184 of file `logger.cpp`.

## 9.122 src/common/utils/monitor/statistics\_monitor.cpp File Reference

```
#include "common/utils/monitor/statistics_monitor.hpp"
#include "common/utils/exceptions.hpp"
#include "common/utils/logging/logger.hpp"
#include <cstring>
#include <cstdlib>
#include <stdio>
#include <sstream>
```

### Namespaces

- [uva](#)
- [uva::utils](#)
- [uva::utils::monitor](#)

## 9.123 src/server/bpbd\_server.cpp File Reference

```
#include <cctype>
#include <cstdlib>
#include <string>
#include <websocketpp/common/thread.hpp>
#include <tclap/CommandLine.h>
#include "main.hpp"
#include "server/server_parameters.hpp"
#include "server/translation_server.hpp"
#include "common/utils/exceptions.hpp"
#include "server/decoder/de_configurator.hpp"
#include "server/lm/lm_configurator.hpp"
#include "server/tm/tm_configurator.hpp"
#include "server/rm/rm_configurator.hpp"
#include "server/cmd_line_handler.hpp"
```

### Macros

- `#define PROGRAM\_VERSION\_STR "1.0"`

### Functions

- void [create\\_arguments\\_parser](#) ()
- void [destroy\\_arguments\\_parser](#) ()
- void [connect\\_to\\_models](#) (const [server\\_parameters](#) &params)
- void [disconnect\\_from\\_models](#) ()
- int [main](#) (int argc, char \*\*argv)

### 9.123.1 Macro Definition Documentation

#### 9.123.1.1 `#define PROGRAM\_VERSION\_STR "1.0"`

Definition at line 62 of file bpbd\_server.cpp.

### 9.123.2 Function Documentation

#### 9.123.2.1 void connect\_to\_models ( const server\_parameters & *params* )

Allows to establish connections to the models: language, translation, reordering

Parameters

|               |                                                              |
|---------------|--------------------------------------------------------------|
| <i>params</i> | the parameters needed to establish connections to the models |
|---------------|--------------------------------------------------------------|

Definition at line 201 of file bpbd\_server.cpp.

#### 9.123.2.2 void create\_arguments\_parser ( )

Creates and sets up the command line parameters parser

Definition at line 81 of file bpbd\_server.cpp.

#### 9.123.2.3 void destroy\_arguments\_parser ( )

Allows to deallocate the parameters parser if it is needed

Definition at line 97 of file bpbd\_server.cpp.

#### 9.123.2.4 void disconnect\_from\_models ( )

Allows to disconnect from the models: language, translation, reordering

Definition at line 218 of file bpbd\_server.cpp.

#### 9.123.2.5 int main ( int *argc*, char \*\* *argv* )

The main program entry point

Definition at line 235 of file bpbd\_server.cpp.

## 9.124 src/server/decoder/de\_configurator.cpp File Reference

```
#include "server/decoder/de_configurator.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::decoder](#)

## 9.125 src/server/lm/builders/lm\_basic\_builder.cpp File Reference

```
#include <iostream>
```



```

#include <string>
#include "common/utils/logging/logger.hpp"
#include "common/utils/string_utils.hpp"
#include "common/utils/file/cstyle_file_reader.hpp"
#include "common/utils/file/file_stream_reader.hpp"
#include "common/utils/file/memory_mapped_file_reader.hpp"
#include "server/lm/lm_consts.hpp"
#include "server/lm/builders/lm_basic_builder.hpp"
#include "server/lm/builders/lm_gram_builder_factory.hpp"
#include "server/lm/models/c2d_map_trie.hpp"
#include "server/lm/models/w2c_hybrid_trie.hpp"
#include "server/lm/models/c2w_array_trie.hpp"
#include "server/lm/models/w2c_array_trie.hpp"
#include "server/lm/models/c2d_hybrid_trie.hpp"
#include "server/lm/models/g2d_map_trie.hpp"
#include "server/lm/models/h2d_map_trie.hpp"

```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbdd](#)
- [uva::smt::bpbdd::server](#)
- [uva::smt::bpbdd::server::lm](#)
- [uva::smt::bpbdd::server::lm::arpa](#)

## Macros

- [#define INSTITUTE\\_TRIE\\_BUILDER\\_FILE\\_READER\(TFileReaderModel\)](#)

## Functions

- [uva::smt::bpbdd::server::lm::arpa::INSTITUTE\\_TRIE\\_BUILDER\\_FILE\\_READER \(cstyle\\_file\\_reader\)](#)
- [uva::smt::bpbdd::server::lm::arpa::INSTITUTE\\_TRIE\\_BUILDER\\_FILE\\_READER \(file\\_stream\\_reader\)](#)
- [uva::smt::bpbdd::server::lm::arpa::INSTITUTE\\_TRIE\\_BUILDER\\_FILE\\_READER \(memory\\_mapped\\_file\\_reader\)](#)

### 9.125.1 Macro Definition Documentation

#### 9.125.1.1 [#define INSTITUTE\\_TRIE\\_BUILDER\\_FILE\\_READER\( TFileReaderModel \)](#)

Definition at line 494 of file lm\_basic\_builder.cpp.

## 9.126 src/server/lm/builders/lm\_gram\_builder.cpp File Reference

```
#include "server/lm/builders/lm_gram_builder.hpp"
#include <string>
#include <vector>
#include <stdexcept>
#include <algorithm>
#include "common/utils/logging/logger.hpp"
#include "common/utils/string_utils.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
#include "server/lm/dictionaries/hashing_word_index.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::arpa](#)

### Macros

- [#define INSTANTIATE\\_ARPA\\_GRAM\\_BUILDER\\_LEVEL\\_WEIGHT\(LEVEL, IS\\_MULT\\_WEIGHT\)](#)
- [#define INSTANTIATE\\_ARPA\\_GRAM\\_BUILDER\\_LEVEL\(LEVEL\)](#)

### Functions

- [uva::smt::bpbd::server::lm::arpa::INSTANTIATE\\_ARPA\\_GRAM\\_BUILDER\\_LEVEL \(M\\_GRAM\\_LEVEL\\_1\)](#)
- [uva::smt::bpbd::server::lm::arpa::INSTANTIATE\\_ARPA\\_GRAM\\_BUILDER\\_LEVEL \(M\\_GRAM\\_LEVEL\\_2\)](#)
- [uva::smt::bpbd::server::lm::arpa::INSTANTIATE\\_ARPA\\_GRAM\\_BUILDER\\_LEVEL \(M\\_GRAM\\_LEVEL\\_3\)](#)
- [uva::smt::bpbd::server::lm::arpa::INSTANTIATE\\_ARPA\\_GRAM\\_BUILDER\\_LEVEL \(M\\_GRAM\\_LEVEL\\_4\)](#)
- [uva::smt::bpbd::server::lm::arpa::INSTANTIATE\\_ARPA\\_GRAM\\_BUILDER\\_LEVEL \(M\\_GRAM\\_LEVEL\\_5\)](#)
- [uva::smt::bpbd::server::lm::arpa::INSTANTIATE\\_ARPA\\_GRAM\\_BUILDER\\_LEVEL \(M\\_GRAM\\_LEVEL\\_6\)](#)
- [uva::smt::bpbd::server::lm::arpa::INSTANTIATE\\_ARPA\\_GRAM\\_BUILDER\\_LEVEL \(M\\_GRAM\\_LEVEL\\_7\)](#)

### 9.126.1 Macro Definition Documentation

#### 9.126.1.1 #define INSTANTIATE\_ARPA\_GRAM\_BUILDER\_LEVEL( LEVEL )

##### Value:

```
INSTANTIATE_ARPA_GRAM_BUILDER_LEVEL_WEIGHT(LEVEL, true); \
 INSTANTIATE_ARPA_GRAM_BUILDER_LEVEL_WEIGHT(LEVEL, false);
```

Definition at line 193 of file lm\_gram\_builder.cpp.

## 9.126.1.2 #define INSTANTIATE\_ARPA\_GRAM\_BUILDER\_LEVEL\_WEIGHT( LEVEL, IS\_MULT\_WEIGHT )

## Value:

```
template class lm_gram_builder<basic_word_index, LEVEL, IS_MULT_WEIGHT>; \
 template class lm_gram_builder<counting_word_index, LEVEL, IS_MULT_WEIGHT>; \
 template class lm_gram_builder<hashing_word_index, LEVEL, IS_MULT_WEIGHT>; \
 template class lm_gram_builder<basic_optimizing_word_index, LEVEL, IS_MULT_WEIGHT>; \
 template class lm_gram_builder<counting_optimizing_word_index, LEVEL, IS_MULT_WEIGHT>;
```

Definition at line 186 of file lm\_gram\_builder.cpp.

## 9.127 src/server/lm/lm\_configurator.cpp File Reference

```
#include "server/lm/lm_configurator.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## 9.128 src/server/lm/lm\_query.cpp File Reference

```
#include <string>
#include <iostream>
#include <sstream>
#include <fstream>
#include <math.h>
#include "tclap/CommandLine.h"
#include "main.hpp"
#include "common/utis/monitor/statistics_monitor.hpp"
#include "common/utis/logging/logger.hpp"
#include "common/utis/string_utils.hpp"
#include "common/utis/exceptions.hpp"
#include "common/utis/file/afireader.hpp"
#include "common/utis/file/memory_mapped_file_reader.hpp"
#include "common/utis/file/file_stream_reader.hpp"
#include "common/utis/file/cstyle_file_reader.hpp"
#include "server/lm/lm_executor.hpp"
```

## Macros

- #define [PROGRAM\\_VERSION\\_STR](#) "1.1"

## Functions

- void [create\\_arguments\\_parser](#) ()
- void [destroy\\_arguments\\_parser](#) ()
- int [main](#) (int argc, char \*\*argv)

### 9.128.1 Macro Definition Documentation

#### 9.128.1.1 `#define PROGRAM_VERSION_STR "1.1"`

Definition at line 61 of file `lm_query.cpp`.

### 9.128.2 Function Documentation

#### 9.128.2.1 `void create_arguments_parser ( )`

Creates and sets up the command line parameters parser

Definition at line 83 of file `lm_query.cpp`.

#### 9.128.2.2 `void destroy_arguments_parser ( )`

Allows to deallocate the parameters parser if it is needed

Definition at line 105 of file `lm_query.cpp`.

#### 9.128.2.3 `int main ( int argc, char ** argv )`

The main program entry point

Definition at line 149 of file `lm_query.cpp`.

## 9.129 `src/server/lm/mgrams/byte_m_gram_id.cpp` File Reference

```
#include "server/lm/mgrams/m_gram_id.hpp"
#include <inttypes.h>
#include "server/lm/lm_consts.hpp"
#include "server/lm/lm_configs.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/dictionaries/aword_index.hpp"
#include "common/utils/file/text_piece_reader.hpp"
#include "common/utils/hashing_utils.hpp"
#include "common/utils/math_utils.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::m\\_grams](#)
- [uva::smt::bpbd::server::lm::m\\_grams::m\\_gram\\_id](#)

### Macros

- `#define MAX_VALUE_IN_BYTES(NUM_BYTES) (const_expr::power(2, BYTES_TO_BITS(NUM_BYTES)) - 1)`

### 9.129.1 Macro Definition Documentation

9.129.1.1 `#define MAX_VALUE_IN_BYTES( NUM_BYTES ) (const_expr::power(2, BYTES_TO_BITS(NUM_BYTES)) - 1)`

Definition at line 59 of file `byte_m_gram_id.cpp`.

## 9.130 src/server/lm/mgrams/model\_m\_gram.cpp File Reference

```
#include "server/lm/mgrams/model_m_gram.hpp"
#include "common/utils/string_utils.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::m\\_grams](#)

### Functions

- `ostream & uva::smt::bpbd::server::lm::m\_grams::operator<< (ostream &stream, const model_m_gram &gram)`

## 9.131 src/server/lm/mgrams/query\_m\_gram.cpp File Reference

```
#include "server/lm/mgrams/query_m_gram.hpp"
#include "common/utils/string_utils.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)
- [uva::smt::bpbd::server::lm::m\\_grams](#)

### Functions

- `ostream & uva::smt::bpbd::server::lm::m\_grams::operator<< (ostream &stream, const query_m_gram &gram)`

### 9.132 src/server/lm/models/c2d\_hybrid\_trie.cpp File Reference

```
#include "server/lm/models/c2d_hybrid_trie.hpp"
#include <stdexcept>
#include <sstream>
#include <algorithm>
#include "common/utils/logging/logger.hpp"
#include "common/utils/string_utils.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
```

#### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

#### Functions

- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_hybrid\_trie, basic\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_hybrid\_trie, counting\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_hybrid\_trie, hashing\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_hybrid\_trie, basic\_optimizing\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_hybrid\_trie, counting\_optimizing\_word\_index)

### 9.133 src/server/lm/models/c2d\_map\_trie.cpp File Reference

```
#include "server/lm/models/c2d_map_trie.hpp"
#include <stdexcept>
#include <sstream>
#include <algorithm>
#include "common/utils/logging/logger.hpp"
#include "common/utils/string_utils.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
```

#### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Functions

- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_map\_trie, basic\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_map\_trie, counting\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_map\_trie, hashing\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_map\_trie, basic\_optimizing\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2d\_map\_trie, counting\_optimizing\_word\_index)

## 9.134 src/server/lm/models/c2w\_array\_trie.cpp File Reference

```
#include "server/lm/models/c2w_array_trie.hpp"
#include <inttypes.h>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Functions

- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2w\_array\_trie, basic\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2w\_array\_trie, counting\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2w\_array\_trie, hashing\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2w\_array\_trie, basic\_optimizing\_word\_index)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) (c2w\_array\_trie, counting\_optimizing\_word\_index)

## 9.135 src/server/lm/models/g2d\_map\_trie.cpp File Reference

```
#include "server/lm/models/g2d_map_trie.hpp"
```

```
#include <inttypes.h>
#include <algorithm>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Functions

- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(g2d\\_map\\_trie, basic\\_word\\_index\)](#)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(g2d\\_map\\_trie, counting\\_word\\_index\)](#)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(g2d\\_map\\_trie, hashing\\_word\\_index\)](#)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(g2d\\_map\\_trie, basic\\_optimizing\\_word\\_index\)](#)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(g2d\\_map\\_trie, counting\\_optimizing\\_word\\_index\)](#)

## 9.136 src/server/lm/models/h2d\_map\_trie.cpp File Reference

```
#include "server/lm/models/h2d_map_trie.hpp"
#include <inttypes.h>
#include <algorithm>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)



## Functions

- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(h2d\\_map\\_trie, basic\\_word\\_index\)](#)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(h2d\\_map\\_trie, counting\\_word\\_index\)](#)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(h2d\\_map\\_trie, hashing\\_word\\_index\)](#)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(h2d\\_map\\_trie, basic\\_optimizing\\_↵word\\_index\)](#)
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_TRIE\\_TEMPLATE\\_TYPE \(h2d\\_map\\_trie, counting\\_optimizing\\_↵word\\_index\)](#)

## 9.137 src/server/lm/models/m\_gram\_query.cpp File Reference

```
#include "server/lm/models/m_gram_query.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Functions

- [ostream & uva::smt::bpbd::server::lm::operator<< \(ostream &stream, const m\\_gram\\_query &query\)](#)

## 9.138 src/server/lm/models/w2c\_array\_trie.cpp File Reference

```
#include "server/lm/models/w2c_array_trie.hpp"
#include <inttypes.h>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Functions

- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_array\\_trie](#), [basic\\_word\\_index](#))
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_array\\_trie](#), [counting\\_word\\_index](#))
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_array\\_trie](#), [hashing\\_word\\_index](#))
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_array\\_trie](#), [basic\\_optimizing\\_word\\_index](#))
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_array\\_trie](#), [counting\\_optimizing\\_word\\_index](#))

### 9.139 src/server/lm/models/w2c\_hybrid\_trie.cpp File Reference

```
#include "server/lm/models/w2c_hybrid_trie.hpp"
#include <inttypes.h>
#include "server/lm/lm_consts.hpp"
#include "common/utils/logging/logger.hpp"
#include "common/utils/exceptions.hpp"
#include "server/lm/dictionaries/basic_word_index.hpp"
#include "server/lm/dictionaries/counting_word_index.hpp"
#include "server/lm/dictionaries/optimizing_word_index.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::lm](#)

## Functions

- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_hybrid\\_trie](#), [basic\\_word\\_index](#))
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_hybrid\\_trie](#), [counting\\_word\\_index](#))
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_hybrid\\_trie](#), [hashing\\_word\\_index](#))
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_hybrid\\_trie](#), [basic\\_optimizing\\_word\\_index](#))
- [uva::smt::bpbd::server::lm::INSTANTIATE\\_LAYERED\\_TRIE\\_TEMPLATES\\_NAME\\_TYPE](#) ([w2c\\_hybrid\\_trie](#), [counting\\_optimizing\\_word\\_index](#))

### 9.140 src/server/rm/rm\_configurator.cpp File Reference

```
#include "server/rm/rm_configurator.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::rm](#)

## 9.141 src/server/tm/models/tm\_target\_entry.cpp File Reference

```
#include "server/tm/models/tm_target_entry.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)
- [uva::smt::bpbd::server::tm::models](#)

## 9.142 src/server/tm/tm\_configurator.cpp File Reference

```
#include "server/tm/tm_configurator.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)
- [uva::smt::bpbd::server::tm](#)

## 9.143 src/server/trans\_task\_pool.cpp File Reference

```
#include <functional>
#include "server/trans_task_pool.hpp"
```

## Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

## 9.144 src/server/trans\_task\_pool\_worker.cpp File Reference

```
#include "server/trans_task_pool_worker.hpp"
#include "server/trans_task_pool.hpp"
```

### Namespaces

- [uva](#)
- [uva::smt](#)
- [uva::smt::bpbd](#)
- [uva::smt::bpbd::server](#)

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