**OTDB**

Messagebus service

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Abstract

In 2015 LOFAR decided to introduce mesagebus technologie to simplify communication between components and improve the architecture of LOFAR. Part of these changes is that the databases need to expose there functionality to the message bus. For the OTDB database a OTDBService component is made that current exposes the most important functions.

This documents informs the programmers that need access to OTDB how they can interface with the OTDB service.

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# Introduction

In 2015 LOFAR decided to introduce messagebus technology to simplify communication between components and improve the architecture of LOFAR. Part of these changes is that the databases need to expose there functionality to the message bus. For the OTDB database a OTDBService component is made that current exposes the most important functions.

Message bus

Component X

GUI

UI

OTDB service

Component Y

OTDB

other database

other service

Figure 1: Idea of the messagebus structure LOFAR has introduced.

Gradually the existing software of LOFAR will be modified to work with the messagebus technology. This will finally result in an architecture were all components are loosely coupled to each other and maintenance will be much easier.

## Scope of this document

This document focuses on the *Python* version of the OTDB service that exposes (parts of) the functionally of OTDB to the message bus.

All functions return a 'dict' data-structure in Python that is sent in the 'content' field in the response message to the messagebus. The QPID messagebus software translates that to its internal QPID variant-map format for transferring it over the messagebus. Depending on the programming language of the receiver this result is a corresponding data-type:

Python : dict

C++ : variant map

Java : hash map

# Interface for Python

## Generic rules

Since all functions are called through a message bus RPC mechanism each function can also return an exception that relates to the communication over the message bus like time-out. These exceptions are not mentioned in the specifications of each command.

### Set Commands

Set-commands return an Exception or dict with a 'Success' field that contains the value True or False.

When this value is False than an field 'Errors' exists containing the errors that occurred.

### Get commands

Get-commands return an Exception or a dict. When the dict contains the field 'Errors' the execution went (partially) wrong and content of the Errors field contains the problems.

When dict does NOT contains the key 'Errors' the dict contains the command specific result.

### Task identification

Every call the related to a task can have two different identifiers for the task, the OtdbID or the MomID. The OTDBService will use these keys to locate the indicated task. At least one the key must be present of course. When *both* key are specified the value of the OtdbID will be used first as search key in the database, if not found on the OtdbID than the MomID will be used.

The OtdbID and the MomID of the task will both be present in the response of the function call.

E.g.

{'MomID': 869321, 'Success': True, 'OtdbID': 1099269 }

## TaskGetSpecification

|  |  |  |
| --- | --- | --- |
| Interface | TaskGetSpecification | |
| Operations | Function for retrieving the specification of a task. | |
| Input | OtdbID / MomID | integer: referring to an existing task. |
| Output | TaskSpecification | dict with the result. See below this table for the content. |
| Exceptions | AttributeError | There is something wrong with the given input values. |
|  | FunctionError | An error occurred during the execution of the function. The text of the exception explains what is wrong. |
| Works on | Templates / VIC / PIC | |

The content of the TaskSpecification value depends on the type of tree that was questioned. A PIC tree only contains the elements from the instrument without any value. It is therefor a list.

{ 'TaskSpecification': [key1, key2, ...]}

In case of querying a template of VIC tree the TaskSpecification contains a dict with key-values:

{ 'TaskSpecification': {'key1': value1, 'key2' : value2, ...}}

## TaskCreate

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| --- | --- | --- |
| Interface | TaskCreate | |
| Operations | Function to create a task with the given specification. Before creating a task the OTDBService first searches for a task that has the given MOMID to avoid duplicate tasks. If such a task does not exist it is created and given the MomID and campaign that is specified in the input arguments. | |
| Input | MomID | integer: might refer to an existing task otherwise the create task will get this value for the mom\_id field. |
|  | TemplateName | string: name of the default template that should be used to create the task. Optional field, only needed when the task does not exist yet. |
|  | CampaignName | string: name of the campaign that refers to an existing campaign/project. Optional field, only needed when the task does not exist yet. |
|  | Specifications | dict with the specifications. |
| Output | <default answer> |  |
| Exceptions | AttributeError | There is something wrong with the given input values. |
|  | FunctionError | An error occurred during the execution of the function. The text of the exception explains what is wrong. |
| Works on | Templates / VIC | |

## TaskSetSpecification

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| --- | --- | --- |
| Interface | TaskSetSpecification | |
| Operations | Searches for the specified task and tries to update all the specified keys to the specified values. | |
| Input | OtdbID / MomID | integer: referring to an existing task |
|  | Specifications | dict with the specifications to update. |
| Output | <default result> |  |
| Exceptions | AttributeError | There is something wrong with the given input values. |
|  | FunctionError | An error occurred during the execution of the function. The text of the exception explains what is wrong. |
| Works on | Templates / VIC | |

## TaskSetStatus

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| --- | --- | --- |
| Interface | TaskSetStatus | |
| Operations | Function to change the status of a task. | |
| Input | OtdbID / MomID | integer referring to an existing task |
|  | NewStatus | string. Value must be one of the predefined values:  described, prepared, approved, on\_hold, conflict, prescheduled, scheduled, queued, active, completing, finished, aborted, error, obsolete |
|  | UpdateTimestamps | Boolean : optional parameter to also update the timestamp of the metadata of the tree when the status of the tree is changed into 'active', 'finished' or 'aborted'. Resp. starttime or endtime. Default this option is ON. |
| Output | <default result> |  |
| Exceptions | AttributeError | There is something wrong with the given input values. |
|  | FunctionError | An error occurred during the execution of the function. The text of the exception explains what is wrong. |
| Works on | Templates / VIC / PIC | |

## TaskPrepareForScheduling

|  |  |  |
| --- | --- | --- |
| Interface | TaskPrepareForScheduling | |
| Operations | Function the prepare a task (specification) for scheduling (by converting the specification into a VIC tree). If the identifier of the task already refers to a VIC tree the conversion is skipped.  In all cases the status of the task is set to 'approved' whenever the status of the task was something else. | |
| Content | OtdbID / MomID | integer referring to an existing task |
|  | StartTime | string. Optional parameter to set the start time of the task. |
|  | StopTime | string. Optional parameter to set the stop time of the task. |
| Output | <default result> | Note: The returned OtdbID refers to the - existing or created - task (VIC-tree). |
| Exceptions | AttributeError | There is something wrong with the given input values. |
|  | FunctionError | An error occurred during the execution of the function. The text of the exception explains what is wrong. |
| Works on | Templates / VIC | |

## TaskDelete

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| --- | --- | --- |
| Interface | TaskDelete | |
| Operations | Function to delete a task. | |
| Input | OtdbID / MomID | integer referring to an existing task |
| Output | <default result> |  |
| Exceptions | AttributeError | There is something wrong with the given input values. |
|  | FunctionError | An error occurred during the execution of the function. The text of the exception explains what is wrong. |
| Works on | Templates / VIC / PIC | |

## TaskGetIDs

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| Interface | TaskGetIDs | |
| Operations | This is actually an internal function of the OTDB service to locate a tree that is specified by either OtdbID or MomID. It is use be most other functions of the OTDB service. | |
| Input | OtdbID / MomID | integer referring to an existing task |
| Output | <default result> |  |
| Exceptions | None |  |
| Works on | Templates / VIC / PIC | |

## GetDefaultTemplates

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| Interface | GetDefaultTemplates | |
| Operations | Function to retrieve a list of all (active) default templates. | |
| Input | None |  |
| Output | DefaultTemplates | Dict containing the default template information. See below this table for the layout. |
| Exceptions | AttributeError | There is something wrong with the given input values. |
|  | FunctionError | An error occurred during the execution of the function. The text of the exception explains what is wrong. |
| Works on | N/A | |

Returns a dict where every default template is mentioned as a key with the related values of that default template gathered in a dict value.

{ 'BeamObservation': { 'processSubtype': 'Beam Observation',

'processType': 'Observation',

'OtdbID': 1099244,

'Strategy': 'default'},

'BeamObservationNoStationControl' : { 'processSubtype': 'Beam Observation',

'processType': 'Observation',

'OtdbID': 1099228,

'Strategy': 'no\_stationcontrol'}

...

}

## GetStations

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| Interface | GetStations | |
| Operations | Function to retrieve a list of all defined stations  Note: the list is constructed from the active PIC tree. | |
| Input | None |  |
| Output | Stations | Dict containing the station information. See below this table for the layout. |
| Exceptions | AttributeError | There is something wrong with the given input values. |
|  | FunctionError | An error occurred during the execution of the function. The text of the exception explains what is wrong. |
| Works on | N/A | |

Returns a dict where every stations is mentioned as a key with the related location of that stations as the value.

{ 'FR606': 'Europe', 'RS208': 'Remote', 'CS021': 'Core', 'RS106': 'Remote',

'CS103': 'Core', 'CS101': 'Core', 'UK608': 'Europe', 'RS205': 'Remote',

'CS028': 'Core', 'CS003': 'Core', 'CS002': 'Core', 'CS001': 'Core',

...

'CS031': 'Core', 'CS024': 'Core' }

## SetProject

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| --- | --- | --- |
| Interface | SetProject | |
| Operations | Function to update or create a project record. If the project is found on the given name than that project is updates else a new project record is created. | |
| Content | name | string(30): name of the project. |
|  | title | string(100) : short description of the project (max 100 characters) |
|  | pi | string(80): name of the Project Investigator |
|  | co\_i | string(80): name of the Co-Investigator. |
|  | contact | string(120): who to contact. |
| Output | projectID | integer: identifier of the project. |
| Exceptions | AttributeError | There is something wrong with the given input values. |
|  | FunctionError | An error occurred during the execution of the function. The text of the exception explains what is wrong. |
| Works on | N/A | |