Capacity Management SDK

for

Version 4.5

Table of Content

1 Introduction 4
1.1 Document Purpose 4
1.2 Scope of the Document 4
1.3 Target Audience 4
1.4 Glossary 4
2 Capacity Management API Overview 6
2.1 Capacity Calculation 6
2.1.1 Supplementary Terms and Definitions 6
2.1.1.1 Work Skills 6
2.1.1.2 Capacity Categories 6
2.1.1.3 Time Slots 7
2.1.1.4 Capacity Bucket 7
2.1.1.5 Date 7
2.1.1.6 Work Zones 7
2.1.1.7 Quota 8
2.1.1.7.1 Close Quota 8
2.1.1.8 Used 8
2.1.2 Capacity 8
2.2 Duration, Travel Time, Capacity Category Calculation 9
2.2.1 Capacity Cache 9
2.3 'user' Authentication Structure 10
2.3.1 Authentication 10
2.4 Mandatory and Optional Properties 11
3 Capacity Management API Methods 12
3.1 'get_capacity' Method 13
3.1.1 'get_capacity' Request 13
3.1.2 'activity_field' Node 15
3.1.2.1 'get_capacity' Request Example 16
3.1.3 'get_capacity' Response 17
3.1.3.1 'get_capacity' Response Example 19
3.1.4 'get_capacity' Logics Example 22
3.1.5 'get_capacity' Error Conditions 25
3.1.5.1 'get_capacity' Error Codes 25
3.2 'get_quota_data' Method 26
3.2.1 'get_quota_data' Request 26
3.2.1.1 'get_quota_data' Request Example 28
3.2.2 'get_quota_data' Response 29
3.2.2.1 'get_quota_data' Response Example 35
3.2.3 'get_quota_data' Error Codes 40
3.3 'set_quota' Method 41
3.3.1 'set_quota' Request 41
3.3.1.1 'set_quota' Request Example 44
3.3.2 'set_quota' Response 46
3.3.2.1 'set_quota' Response Example 46
3.3.3 'set_quota' Error Codes 48
3.4 'get_quota_close_time' Method 49

3.4.1 'get_quota_close_time' Request 49
3.4.1.1 'get_quota_close_time' Request Example 49
3.4.2 'get_quota_close_time' Response 50
3.4.2.1 'get_quota_close_time' Response Example 50
3.4.3 'get_quota_close_time' Error Codes 51
3.5 'set_quota_close_time' Method 52
3.5.1 'set_quota_close_time' Request 52
3.5.1.1 'set_quota_close_time' Request Example 52
3.5.2 'set_quota_close_time' Response 54
3.5.2.1 'set_quota_close_time' Response Example 54
3.5.3 'set_quota_close_time' Error Codes 56
4 Transaction Errors 57
4.1 SOAP Faults 57
4.2 Error Codes 58
5 Previous Versions 61

1 Introduction

1.1 Document Purpose

The document is intended to ensure successful interaction of the Client-developed applications and ETAdirect application server, where those are related to Capacity management applications and APIs.

1.2 Scope of the Document

The document provides description of Capacity management-related SOAP elements and the methods used to retrieve or update capacity data. The document is up-to-date with version 4.5.12 of ETAdirect.

1.3 Target Audience

This document is intended mainly for developers of SOAP Client Applications.

1.4 Glossary

Term	Explanation
Activity	Entity of the ETAdirect system that represents any time consuming activity of the resource
Bucket	Entity appearing on the resource tree which can contain resources of a defined type and be assigned activities
Capacity	Workforce possessing the necessary work skills available at a certain moment of time
Capacity category	Predefined set of work skills, work skill groups and time slots within which they are considered by the Capacity Management API
Customer	End-customer, entity that benefits from the activity
ISO 8601 format	see http://en.wikipedia.org/wiki/ISO_8601
Other activities	All repeating, mass and shift activities, including those without instances, which are not part of Quota management
Quota	Number of minutes allocated by the company to perform activities of a specific capacity category within specific time period by resources of a specific bucket and date
Resource	Element in the resource tree representing a defined company asset
Resource External ID	Company-unique key used to identify a specific resource
Resource tree	Hierarchy of company resources showing “parent-child” relationships
SOAP 1.1	Lightweight protocol for exchange of information in a decentralized, distributed environment see http://www.w3.org/TR/2000/NOTE-SOAP-20000508/
SOAP Interface	Interface used to receive requests and return responses via SOAP
SOAP Client Application	Application running at the Client's site and providing interaction with ETAdirect server via SOAP
SOAP Fault	SOAP element used to carry error and/or status information in a SOAP message
Statistics Agent	ETAdirect module used to recalculate travel and duration statistics based on the more recent data received in the database since its previous run
Time Slot	1) Fixed service window defined with a name and label, specifying when certain

Term	Explanation
	types of activities can be performed 2) Service Window (if the activity type does not support time slots)
Used	Number of minutes actually booked to perform activities of a specific capacity category within specific time period by resources of a specific bucket and date
User	1) Person using ETAdirect 2) Entity used for authentication and authorization, allowing people or external software to access ETAdirect
Work Skill	1) Activity that a resource is qualified to perform (resource property) 2) Qualification required to perform an activity (activity property)
Work Skill Conditions	Set of conditions based on the values of specific activity properties that is used to define the work skills for the activity
Work Skill Group	Several work skills combined in a group. When a work skill group is assigned to a resource, the resource receives all work skills in the group with their levels
Work Zone	Defined geographical area in which a resource can perform an activity

2 Capacity Management API Overview

The function of the Capacity Management API is to transmit data on the number of man-minutes available for a specific date, time-slot and set of capacity categories to an external system for the order booking process.

Along with that, it can be used to retrieve duration, travel time and capacity categories of an activity.

2.1 Capacity Calculation

Having processed the request, the API can return the capacity value. The basic elements used in the calculation of the 'Capacity' value are described below.

2.1.1 Supplementary Terms and Definitions

2.1.1.1 Work Skills

In ETAdirect a Work Skill may be a skill which a resource is qualified to perform – resource work skill or a skill which is required to perform an activity – activity work skill.

Resource Work Skills	Activity Work Skills
Can be manually defined as part of resource information (Manage Application → Settings → Technician/Bucket info). Work skills can be defined for buckets and resources that can execute activities.	Are automatically calculated in accordance with the work skill conditions (Manage Application → Company Settings → Work Skill Conditions).
Qualification level (from 1 to 100) can be defined for each work skill assigned to a resource.	Each work skill condition defines the Required Qualification level from 0 to 100 and the Preferable qualification level from 1 to 100.
Several work skills can be defined for each resource.	One activity can match several work skill conditions and have several work skills.
If no specific work skills are defined for a resource, it is treated as if the resource has all work skills defined for the company with 100 qualification.	If no work skill can be defined for an activity (it matches no work skill conditions), such activity will be processed by the Capacity Management API as part of 'Other activities'.
If a work skill is assigned to a resource that can execute activities, it is used to define which activities can be assigned to it.	An activity can be assigned only to the resource that has all skills required to perform the activity with the qualification level not less than required.
If a work skill is assigned to a bucket, the Capacity Management API will return data only for those work skills.	Activity can be placed in the bucket regardless of its work skills.

2.1.1.2 Capacity Categories

Capacity category is a predefined set of work skill and work skill groups and time slots within which they will be considered by the Capacity Management API. A capacity category can consist of a single work skill.

Within a capacity category the minimum required level of the skill can be defined, so, for example, a

category can be created for all customer-oriented works related to the Internet connection and a separate group for the same works but for VIP customers or of a high difficulty. The two categories would contain the same work skills but the minimal qualification level in the VIP group would be higher.

NOTE: If a capacity category contains a group of work skills, the activity matches the category if it requires at least one of work skills from the group.

2.1.1.3 Time Slots

Time slot is a company specific HH:MM time-period (from-to) for which a label and name are defined. The name of the time-slot will appear in the ETAdirect GUI and the label will be transmitted to an external system to define the time-period.

A set of time slots can be defined for activity types and capacity categories.

Time Slots of Activity Types	Time Slots of Capacity Categories
When a Time Slot is created/modified, it can be assigned a list of Activity Types (Manage Application → Company Settings → Time Slots → Add new/modify → Activity Types).	When a Time Slot is created/modified, it can be assigned a list of Capacity Categories (Manage Application → Company Settings → Time Slots → Add new/modify → Work Skill Types).
When an Activity Type is created/modified, it can be assigned a list of Time Slots (Manage Application → Company Settings → Activity Types → Add/Modify Activity Type → Available Time Slots).	When an Capacity Category is created/modified, it can be assigned a list of Time Slots (Manage Application → Company Settings → Capacity Categories → Time Slots).
For each activity of the type a service window can be defined only as one of the time slots assigned to it.	**For each Capacity Category capacity can be managed only for the time slots assigned to it** (Quota can be changed, Used can be calculated and Capacity Management API can process data).
If no time-slots are defined/active for the company, it is possible to define the service window as from-to HH:MM values.	**If no time-slots are defined/active for the company, it is impossible to use the Capacity Management functionality.**

2.1.1.4 Capacity Bucket

Bucket is a parent resource (group of resources) that can be assigned activities but cannot perform them. If the 'Bucket' and 'Used for Quota management' options are checked for a resource type (Manage Application → Company Settings → Resource Types → Add/Modify Resource Type), the resources and activities of the bucket will be considered by the Capacity Management API. Such bucket is referred to as capacity bucket**.** For each capacity bucket it is possible to define the list of Capacity categories and time slots. When processing data for the Capacity bucket only the defined capacity categories will be considered. For each of the capacity categories only the time slots defined both for the capacity category and the capacity bucket are considered.

2.1.1.5 Date

Date is a calendar day + working time hours since midnight as defined for the company in the Manage Application → Company Settings → Business Rules → Overnight work, if the company uses overnight.

2.1.1.6 Work Zones

In ETAdirect work zone may be a zone where a resource is authorized to perform tasks – resource

work zone, or a zone where an activity is to be performed – activity work zone.

Resource Work Zone	Activity Work Zone
Can be manually defined as part of resource information (Manage Application → Settings → Technician work zones) and is inherited from parent to a direct child.	Is automatically calculated in accordance with the work zone conditions (Manage Application → Company Settings → Work zone dictionary) for the fields and custom properties defined in the Work Zone Key.
Several work zones can be defined for each resource.	One activity can match one work zone.

2.1.1.7 Quota

Quota is the number of man-minutes allocated by the company to the resources of a capacity bucket for a specific date, time slot and capacity category. Quota can be manually updated or automatically filled-in on the basis of a tailored set of previous values in the Manage Application → Quota view.

2.1.1.7.1 Close Quota

When using the Capacity/Quota Management functionality, it is often important to be able to stop taking orders for a specific time (e.g. orders that have to be started by 5 PM cannot be booked after 2 PM). As of ETAdirect version 4.2 it is possible to 'close the quota'. If Quota is closed, the Capacity Management API will return no quota, but the value of the quota does not have to be changed.

The quota can be closed manually or can be scheduled to be automatically closed at a specific time.

Quota can be closed for a specific capacity category, time slot and date. It is possible to lock quota for the whole company, for a subset of specific work zones for the whole company and exclusively for specific work zones.

If quota is closed for a specific capacity category and time slot and work zone, the Capacity Management API request for such capacity category and time slot must contain all fields of the Work Zone Key. Otherwise an error will be returned.

If the values of the fields in the key do not comply with any of the rules defined in the Work Zone Dictionary, the activity will be treated as if it belongs to the company but not to any of its work zones (the 'close quota' parameters set for the company will be applied, if any).

2.1.1.8 Used

Used is the number of man-minutes booked for resources of a capacity bucket for a specific date, time slot and capacity category. Duration and travel of all activities performed and to be performed during the date is considered. If any of the work skills calculated for the activity is one of the work skills of the capacity category, the activity travel and duration will be considered (one activity can be calculated for several capacity categories used).

2.1.2 Capacity

Capacity is the difference between **Quota** and **Used**. Having received the request with the date and capacity bucket, the Capacity Management API can return data on the capacity for all capacity categories and time slots available in the system.

It is also possible to define specific time slots and/or set of capacity categories to retrieve data for.

2.2 Duration, Travel Time, Capacity Category Calculation

A Capacity Management API request can be used to calculate and return some activity parameters. In addition, special request options are to be checked and all data necessary to calculate the values must be present in the request.

For example, capacity management may be used by the Statistics Agent to retrieve travel and duration statistics.

The table below presents the set of parameters, the values of which can be returned with the Capacity Management API to an external system.

Parameter	Description	Flag to check	Properties required for the response
Duration	Number of minutes required to perform an activity	calculate_duration	All properties defined in the Manage Application → Company Settings → Statistics Parameters → Activity duration stats fields
Travel time	Number of minutes required to travel to the activity location from the previous activity (from the start location)	calculate_travel_time	All properties defined in the Manage Application → Company Settings → Statistics Parameters -> Activity travel stats fields
Capacity categories	See capacity categories	calculate_work_skill	All properties used in all conditions defined in the Manage Application → Company Settings → Work Skill Conditions

2.2.1 Capacity Cache

It is important that the process of new activities booking continues even when ETAdirect is temporarily unavailable. In such cases 'get_capacity' requests are processed by ETAdirect cache where the quota data is stored.

NOTE: Cache returns data starting from tomorrow to prevent overbooking for the current day.

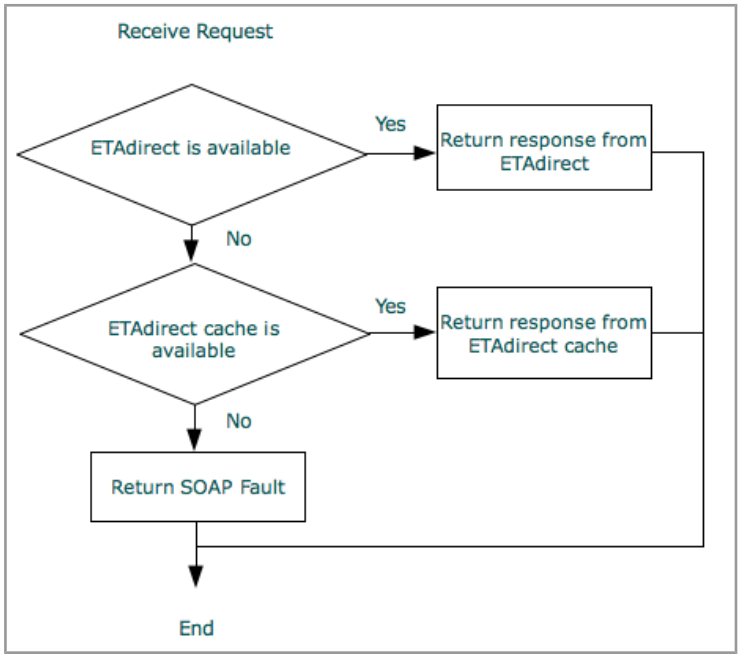

Figure 1: Capacity cache flow

If the ETAdirect cache cannot be accessed, an error is returned as follows:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
   <soapenv:Body>
      <soapenv:Fault>
         <faultcode>soapenv:Server</faultcode>
         <faultstring>Internal Error</faultstring>
         <faultactor>DISPATCHER</faultactor>
      </soapenv:Fault>
   </soapenv:Body>
</soapenv:Envelope>
```

Otherwise standard SOAP FAULT errors may be returned.

2.3 'user' Authentication Structure

All API methods use the 'user' structure as authentication to determine the permissions of the ETAdirect client company user. The ETAdirect SOAP authentication structure has the following **mandatory** fields:

Name	Type	Description
now	string	current time in ISO 8601 format
company	string	case-insensitive identifier of the Client for which data is to be retrieved provided by TOA Technologies during integration
login	string	case-insensitive identifier of a specific user within the Company provided by TOA Technologies during integration
auth_string	string	authentication hash; auth_string = md5(now + md5(password)); where 'password' is a case-sensitive set of characters used for user authentication provided by TOA Technologies during integration

For example:

```
      <user>
        <now>2014-01-10T13:56:50Z</now>
        <login>soap</login>
        <company>in132</company>
        <auth_string>ba8e6417c60e0e1748265252b4f4d601</auth_string>
      </user>
```

2.3.1 Authentication

The 'user' structure is used for the request authentication. If any of the situations below occur, authentication fails and the relevant error is returned.

Authentication fails if:

1	now	is different from the current time on the server and this difference exceeds the predefined time-window (30 minutes by default)
2	company	cannot be found in the ETAdirect
3	login	cannot be found for this company
4	user with this 'login' is not authorized to use the current method	
5	auth_string	is not equal to md5(now+md5(password)) ***For example:*** *'now' = "2005-07-07T09:25:02+00:00" and password = "Pa$$w0rD" then*

md5 (password) = "06395148c998f3388e87f222bfd5c84b"
concatenated string =
= "2005-0707T09:25:02+00:0006395148c998f3388e87f222bfd5c84b"
auth_string should be:
auth_string = "62469089f554d7a38bacd9be3f29a989"

Otherwise authentication is successful and the request is processed further.

2.4 Mandatory and Optional Properties

Each request sent by the Capacity Management API includes properties which are necessary for the request to be processed correctly and those which are only sent when certain value(s) are needed. In this respect, properties fall under either of the following two types:

Optional: the property is not necessary for the request to be processed correctly; if such property is not sent, the request will not return an error; the 'Required' column contains 'No' for such property.

Mandatory: the property must be sent in the request; if a mandatory property is invalid or missing, the request is rejected with a corresponding error; the 'Required' column contains 'Yes' for such property.

3 Capacity Management API Methods

The Capacity Management API uses SOAP version 1.1. to process requests and provide responses. The API uses the following methods:

get_capacity – the method used to return the values of capacity, duration, travel time and capacity categories for the specified capacity bucket on the specified date

get_quota_data – the method used to extract all data available in the Quota View of ETAdirect

set_quota – the method used to set or update the quota parameters

get_quota_close_time – the method used to retrieve the time when the quota is to be closed automatically

set_quota_close_time – the method used to set or update the time when the quota is to be closed automatically

3.1 'get_capacity' Method

The 'get_capacity' method is used to return the values of capacity, duration, travel time and capacity categories for the specified capacity bucket on the specified date.

3.1.1 'get_capacity' Request

The 'get_capacity' request defines:

Capacity parameters:

- capacity bucket and date for which capacity should be returned
- specific time slots and capacity categories for which the returned capacity data (if any) should be filtered
- work zone key parameters, if required (if the quota close time is defined for specific work zones)

Other parameters:

- flags to define if the duration/travel time/capacity categories are to be returned and calculated
- company-specific fields used to calculate duration/travel time/capacity categories (if necessary)

The 'get_capacity' request contains the following parameters:

Name	Required	Type	Description
user	Yes	struct	'user' structure
date	Yes	date	date for which capacity data should be returned in the YYYY-MM-DD format any number of 'date' parameters can be defined
location	No	string	external ID of the capacity bucket
calculate_duration	No	bool	if the flag is checked set to '1' or 'true', the 'activity_field' node should contain the fields required to calculate duration/travel time/capacity category value, respectively, and they will be returned in the response **default value:** false
calculate_travel_time			
calculate_work_skill			
time_slot	No	string	label of the time slot for which capacity data should be returned if the parameter is absent, the data for the full range of time slots is returned
work_skill	No	string	label of capacity category for which capacity data should be returned if the 'work_skill' parameter is absent AND the 'calculate_work_skill' flag is set to 'true', capacity is calculated using 'activity_field' node values if the 'work_skill' parameter is absent AND the 'calculate_work_skill' flag is set to 'false', capacity for all capacity categories defined for the company is returned
activity_field	Yes/No	node	parameters that can be used to define the duration/travel time/capacity category and work zone
dont_aggregate_results	No	bool	option defining whether the results for different buckets within the same request are to be aggregated. When the value is set to '1' or 'true', the results for different buckets are not aggregated and are returned separately **default value:** false

Name	Required	Type	Description
determine_location_by_work_zone	No	bool	option defining whether the capacity bucket is to be determined by the work zone of the activity. When the value is set to '1' or 'true', the work zone to which the activity belongs is retrieved, and all capacity buckets to which such work zone is assigned are processed. In this case the work zone key fields become mandatory. **default value:** false
min_time_to_end_of_time_slot	No	string	parameter defining the minimum remaining time of the time slot. Capacity for the specified time slot is returned only when the calculated value of time remaining before the end of such time slot is equal or greater than the set value. The remaining time is calculated as follows: – for time slot: time slot end minus current time in time zone of capacity bucket – for day or all-day time slot: start of next day minus current time in time zone of capacity bucket **Note**: when the response contains aggregated data of multiple capacity buckets with different time zones and different current time, the function uses the maximum current time value determined among such capacity buckets to check the threshold. Unit of measurement: minutes **valid values**: in the range from -1440000 to 1440000
return_time_slot_info	No	bool	option defining whether the time slot node containing its name, label and time interval is to be returned. **default value:** false
default_duration	No	int	default activity duration. If 'default_duration' is sent, the 'worktype_label' or 'aworktype' fields defining the activity type are mandatory. If the 'Define duration manually' feature is enabled for the activity type, the method returns the sent 'define_duration' value. Otherwise, the statistical value is used. If no statistical record is available for the activity, the sent 'default_duration' value is returned. When 'default_duration' is omitted and the 'Define duration manually' feature is enabled for the activity type, the default duration defined at the company level is returned.

3.1.2 'activity_field' Node

Subject to the specific flags set 'true' in the request, the 'activity_field' node can contain:

All properties used to define the activity duration as defined in the Manage Application → Company Settings → Statistics Parameters → Activity duration stats fields.

All properties used to define the travel time as defined in the Manage Application→ Company Settings → Statistics Parameters → Activity travel stats fields.

All properties used to define the capacity category, i.e. values of all properties used to define work skills for the specific capacity category and used in the Manage Application → Company Settings → Work Skill Conditions.

Along with that, if the Quota is closed at the Work Zone level for the specified time slot and capacity category, or if no time slot and capacity category are specified and the Quota is closed at the Work Zone level anywhere for the date, **all properties used to define the work zone** (defined in Manage Application → Company Settings → Work Zone Dictionary → Work zone key) must be specified.

The work zone key fields are not mandatory if the 'Quota can be closed for' option is disabled at the work zone level in Manage Application → Settings → Technician/Bucket info → Quota management. However, if the 'determine_location_by_work_zone' option is enabled, the work zone key fields also become mandatory.

Activity type: if activity type is selected as the key field for defining activity duration and travel time, it is mandatory to define the activity type in the request. The activity type is defined by either the 'aworktype' field or 'worktype_label' field.

NOTE: the 'aworktype' field accepts activity type IDs while the 'worktype_label' field accepts **only** activity type labels. At the same time, an invalid 'aworktype' value sent in the request is ignored (for backward compatibility purposes) and the request is still processed without error responses, while an invalid label sent in 'worktype_label' leads to an error response. A request containing an invalid 'worktype_label' value will not be processed.

Any number of activity fields can be defined, each 'activity_field' node contains the following mandatory parameters:

Name	Type	Description
name	string	label of the field or custom property that should contain a user-defined value. The value can be found in Manage Application → Company Settings → Properties
value	string	value that should be contained in the defined field. For enum properties – the value type is integer (can be found in Manage Application → Company Settings → Properties/Modify)

NOTE: If any property is added to a key or condition and is not present in the request, the error will be returned (even if the request was processed correctly before).

3.1.2.1 'get_capacity' Request Example

The example below requests capacity data for several capacity buckets for 4-5 February, 2014 for time slots 8-12 and 12-17. The request contains the following parameters:

- 'calculate_duration'. The property defined in Manage Application → Company Settings → Statistics Parameters → Activity duration stats fields is 'activity type'. The type of the activity can be specified by its label ('worktype_label') which in the example below is 'AL'. The 'worktype_label' and its value are sent in the 'activity_field' node. This field is the key for the activity duration statistics.
- 'calculate_travel_time'. The property defined in Manage Application → Company Settings → Statistics Parameters → Activity travel stats fields is post code 'czip' which in the example below is 14101. The 'czip' and its value are sent in the 'activity_field' node. This field is the key for the travel statistics.
- 'calculate_work_skill'.The Work Skill Conditions use property – 'AA_CATEGORY' which in the example below has the value of '4' corresponding to capacity category 'Deinstall'. The 'AA_CATEGORY' and its value are sent in the 'activity_field' node.
- The time slot information is required, therefore, in the request the 'return_time_slot_info' is set to 'true.
- The 'Define duration manually' feature is enabled for the 'AL' type of activities. Therefore the value of duration for this activity is retrieved from the 'default_duration' parameter.
- The request is sent at 10 a.m. on 4 February, 2014, so there is no need to return capacity data for the time slot which ends in less than 2 hours. For this purpose the request includes the 'min_time_to_end_of_time_slot' set to 125 minutes.
- The capacity data is needed for for each capacity bucket separately, therefore, the 'dont_aggregate_results' parameter is set to 'true'.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:urn="urn:toa:capacity">
   <soapenv:Header/>
   <soapenv:Body>
      <urn:get_capacity>
         <user>
            <now>2014-02-04T10:00:28+00:00</now>
            <company>sunrise</company>
            <login>root</login>
            <auth_string>f346612cf354f8d0e447afbe58323072</auth_string>
         </user>
          <date>2014-02-04</date>
         <date>2014-02-05</date>
         <location>planning</location>
         <location>routing</location>
         <time_slot>08-12</time_slot>
         <time_slot>12-17</time_slot>
         <calculate_duration>true</calculate_duration>
         <calculate_travel_time>true</calculate_travel_time>
```

```
         <calculate_work_skill>true</calculate_work_skill>
         <return_time_slot_info>true</return_time_slot_info>
         <dont_aggregate_results>true</dont_aggregate_results>
         <min_time_to_end_of_time_slot>125</min_time_to_end_of_time_slot>
         <default_duration>60</default_duration>
        <activity_field>
            <name>worktype_label</name>
            <value>NC</value>
         </activity_field>
         <activity_field>
            <name>czip</name>
            <value>14101</value>
         </activity_field>
         <activity_field>
            <name>AA_CATEGORY</name>
            <value>4</value>
         </activity_field>
         </urn:get_capacity>
      </urn:get_capacity>
   </soapenv:Body>
</soapenv:Envelope>
```

If the capacity category label is known, it can be defined and then there will be no need to define the fields used to calculate the work skills. For example, the labels of the capacity categories are MW and LLW.

```
         <date>2014-02-04</date>
         <location>planning</location>
         <time_slot>13-15</time_slot>
         <time_slot>15-17</time_slot>
         <work_skill>MW</work_skill>
         <work_skill>LLW</work_skill>
```

If it is necessary to retrieve capacity data for the specific work zone, its key field (which is defined in Manage Application → Company Settings → Work Zone Dictionary → Work Zone Key) can be defined in the 'activity_field' element and all capacity data for all capacity buckets with this work zone will be returned.

```
<date>2014-02-05</date>
      <determine_location_by_work_zone>true</determine_location_by_work_zone>
            <time_slot>12-17</time_slot>
            <time_slot>08-12</time_slot>
        <activity_field>
            <name>czip</name>
            <value>10144</value>
         </activity_field>
```

3.1.3 'get_capacity' Response

If any mandatory parameter of the request is missing, the request fails and a corresponding error

message is returned.

Upon transaction success, 'get_capacity' returns a record or a list of records matching the properties specified in the request and their parameters:

- capacity data for the capacity bucket and date defined (if defined, only for the specified capacity categories and time slots)
- activity duration, if 'calculate_duration' flag in the request is set to 'true'
- activity travel time, if 'calculate_travel_time' flag in the request is set to 'true'
- activity capacity categories, if 'calculate_work_skill' flag in the request is set to 'true'
- time slot data, if 'return_time_slot_info' in the request is set to 'true'

The informative response contains the following elements:

Name	Type	Description
activity_duration	int	predicted duration of the activity in minutes if the 'calculate_duration' is set to 'true' and duration cannot be calculated, the transaction fails and a corresponding error is issued. If the 'Define duration manually' feature is enabled for the activity type, the method returns the sent 'define_duration' value. Otherwise, the statistical value is used. If no statistical record is available for the activity, the sent 'default_duration' value is returned. When 'default_duration' is omitted and the 'Define duration manually' feature is enabled for the activity type, the default duration defined at the company level is returned.
activity_travel_time	int	predicted duration of the activity in minutes If the 'calculate_travel_time' flag is set to 'true' and travel time cannot be calculated, the transaction fails and a corresponding error is issued. If the activity type ('worktype_label' or 'aworktype') is sent in the request, the functional checks whether the 'Calculate travel' feature is enabled for such activity type. If this feature is disabled, '0' is returned as the 'activity_travel_time' value.
capacity	array	capacity data returned for the day, time slot or capacity category specified as one or several 'capacity' nodes the number of nodes returned is the same as the number of variants matching the request (e.g. for each possible time slot, date etc.)
time_slot_info	array	time slot data returned for the specified time slot. 'time_slot_info' is only returned when 'return_time_slot_info' is set to 'true'.

- **'capacity' Array of 'get_capacity' Response**

Name	Type	Description
date	date	date for which capacity quota (*'quota'*) and available capacity ('available') is returned
time_slot	string	time slot for which capacity quota (*'quota'*) and available capacity ('available') is returned
work_skill	string	label of the capacity category for which capacity quota (*'quota'*) and available capacity ('available') is returned if the 'calculate_work_skill' flag is set to 'true' and the work skill cannot be calculated, the transaction fails and a corresponding error is issued
quota	longint	total number of man-minutes available in the bucket for the specified date, time slot and capacity category

Name	Type	Description
available	longint	number of man-minutes available in the bucket for the specified date, time slot and capacity category excluding the minutes already reserved (used) for the same date, time slot and capacity category in the same capacity bucket
location	string	external ID of the capacity bucket for which results are returned

- **'time_slot_info' Array of 'get_capacity' Response**

Name	Type	Description
name	string	name of the time slot for which capacity is requested
label	string	label of the time slot for which capacity is requested
time_from, time_to	time	start and end time of the time slot for which capacity is requested in the HH:MM:SS format

3.1.3.1 'get_capacity' Response Example

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:urn="urn:toa:capacity">
   <SOAP-ENV:Body>
      <urn:get_capacity_response xmlns:urn="urn:toa:capacity">
         <activity_duration>60</activity_duration>
         <activity_travel_time>30</activity_travel_time>
         <capacity>
            <location>routing</location>
            <date>2014-02-04</date>
            <quota>2000</quota>
            <available>1820</available>
         </capacity>
         <capacity>
            <location>routing</location>
            <date>2014-02-04</date>
            <time_slot>12-17</time_slot>
            <quota>1000</quota>
            <available>910</available>
         </capacity>
         <capacity>
            <location>routing</location>
            <date>2014-02-04</date>
            <time_slot>12-17</time_slot>
            <work_skill>04</work_skill>
            <quota>100</quota>
            <available>55</available>
         </capacity>
         <capacity>
            <location>routing</location>
```

```
            <date>2014-02-05</date>
            <quota>2000</quota>
            <available>1910</available>
         </capacity>
         <capacity>
            <location>routing</location>
            <date>2014-02-05</date>
            <time_slot>08-12</time_slot>
            <quota>1000</quota>
            <available>955</available>
         </capacity>
         <capacity>
            <location>routing</location>
            <date>2014-02-05</date>
            <time_slot>08-12</time_slot>
            <work_skill>04</work_skill>
            <quota>100</quota>
            <available>55</available>
         </capacity>
         <capacity>
            <location>routing</location>
            <date>2014-02-05</date>
            <time_slot>12-17</time_slot>
            <quota>1000</quota>
            <available>955</available>
         </capacity>
         <capacity>
            <location>routing</location>
            <date>2014-02-05</date>
            <time_slot>12-17</time_slot>
            <work_skill>04</work_skill>
            <quota>120</quota>
            <available>75</available>
         </capacity>
         <capacity>
            <location>planning</location>
            <date>2014-02-04</date>
            <quota>2100</quota>
            <available>1875</available>
         </capacity>
         <capacity>
            <location>planning</location>
            <date>2014-02-04</date>
            <time_slot>12-17</time_slot>
            <quota>1050</quota>
            <available>915</available>
         </capacity>
```

```
        <capacity>
           <location>planning</location>
           <date>2014-02-04</date>
           <time_slot>12-17</time_slot>
           <work_skill>04</work_skill>
           <quota>150</quota>
           <available>105</available>
        </capacity>
        <capacity>
           <location>planning</location>
           <date>2014-02-05</date>
           <quota>2100</quota>
           <available>2100</available>
        </capacity>
        <capacity>
           <location>planning</location>
           <date>2014-02-05</date>
           <time_slot>08-12</time_slot>
           <quota>1000</quota>
           <available>1000</available>
        </capacity>
        <capacity>
           <location>planning</location>
           <date>2014-02-05</date>
           <time_slot>08-12</time_slot>
           <work_skill>04</work_skill>
           <quota>130</quota>
           <available>130</available>
        </capacity>
        <capacity>
           <location>planning</location>
           <date>2014-02-05</date>
           <time_slot>12-17</time_slot>
           <quota>1200</quota>
           <available>1200</available>
        </capacity>
        <capacity>
           <location>planning</location>
           <date>2014-02-05</date>
           <time_slot>12-17</time_slot>
           <work_skill>04</work_skill>
           <quota>160</quota>
           <available>160</available>
        </capacity>
        <time_slot_info>
           <name>12:00 - 17:00</name>
           <label>12-17</label>
```

```
            <time_from>12:00:00</time_from>
            <time_to>17:00:00</time_to>
         </time_slot_info>
         <time_slot_info>
            <name>08:00 - 12:00</name>
            <label>08-12</label>
            <time_from>08:00:00</time_from>
            <time_to>12:00:00</time_to>
         </time_slot_info>
      </urn:get_capacity_response>
   </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

NOTE! If the work skill defined in the request cannot be performed at all – e.g. no capacity value is defined in the system for the capacity category, or the quota is closed, and/or if the activities of the capacity category cannot be performed in the defined time slot – 'capacity' node is not returned.

3.1.4 'get_capacity' Logics Example

If no statistical data for the company is available, the default duration for the processed activity type with label 'AL' is returned as defined in the 'default_duration' parameter, and 'activity_travel_time' value is returned as defined in Manage Application → Company Settings → Statistics Parameters → Statistics parameters/Default travel average time.

Also 'activity_duration' for the activity type with label 'AL' is returned as 60 minutes according to the value of the 'default_duration' parameter sent in the request.

For 4 February 2014 capacity data is returned only for time slot from 12 to 5 p.m., because the time left from now (2014-04-04 10:00AM) till the end of the current time slot (from 08 to 12 a.m.) is less than 125 minutes. Also the information about time slots with time ranges is returned for the requested time slots in the 'time_slot_info' nodes.

Capacity data for capacity bucket 'routing' for 4 February, 2014:

Level	Time slot	Capacity category	Capacity (minutes)		
			Quota	Used	Available
day	-	-	2000	180	1820
time slot	12-17	-	1000	90	910
capacity category	12-17	MG	100	45	55

Capacity data for capacity bucket 'planning' for 4 February, 2014:

Level	Time slot	Capacity category	Capacity (minutes)		
			Quota	Used	Available
day	-	-	2100	225	1875
time slot	12-17	-	1050	135	915
capacity category	12-17	MG	150	45	105

Capacity data for capacity bucket 'routing' for 5 February, 2014:

Level	Time slot	Capacity category	Capacity (minutes)		
			Quota	Used	Available
day	-	-	2000	90	1910
time slot	08-12	-	1000	45	955
capacity category	08-12	MG	100	45	55
time slot	12-17	-	1000	45	955
capacity category	12-17	MG	120	45	75

Capacity data for capacity bucket 'planning' for 5 February, 2014:

Level	Time slot	Capacity category	Capacity (minutes)		
			Quota	Used	Available
day	-	-	2100	0	2100
time slot	08-12	-	1000	0	1000
capacity category	08-12	MG	130	0	130
time slot	12-17	-	1200	0	1200
capacity category	12-17	MG	160	0	160

Activities to be booked:

activity 1, type 'AL', property 'AA_CATEGORY' with value '4', time slot 12 – 17, duration 60 minutes

activity 2, type 'AL', property 'AA_CATEGORY' with value '4', time slot 08 – 12, duration 60 minutes

The returned capacity data shows the following:

– the activities to be booked match the 'MG' capacity category which is assigned to two processed capacity buckets

– the processed activity type 'AL' has the same duration as the 'default_duration', i.e. 60 minutes

– the returned travel time for the activities of such type is 30 minutes

– therefore, the required capacity for the activity to be booked is 60 + 30 = 90 minutes

The available capacity is checked at all three levels (day, time slot and capacity category), and an activity can be booked only when the lowest of the three 'available' values is sufficient.

When the capacity required for Activity 1 is compared to the available capacity of both buckets, the capacity of 'routing' is insufficient (only 10 minutes are available at the corresponding capacity category level). Therefore, this activity is to be assigned to the 'planning' bucket which has enough capacity (105 minutes available at the corresponding capacity category level).

Capacity data for capacity bucket 'planning' for 4 February, 2014 after Activity 1 is booked (required capacity 90 minutes):

Level	Time slot	Capacity category	Capacity (minutes)		
			Quota	Used	Available
day	-	-	2100	315	1785
time slot	12-17	-	1050	225	825
capacity category	12-17	MG	150	135	15

Activity 2 is to be booked for 5 February, 2014, only, as no more activities can be booked for the requested time slot (08-12) on 4 February, 2014.

When the capacity required for Activity 2 is compared to the available capacity of both buckets for 5 February, 2014, the capacity of 'planning' is insufficient (only 55 minutes are available at the corresponding capacity category level). Therefore, this activity is to be assigned to the 'routing' bucket which has enough capacity (130 minutes available at the corresponding capacity category level).

Capacity data for capacity bucket 'routing' for 5 February, 2014 after Activity 2 is booked (required capacity 90 minutes):

Level	Time slot	Capacity category	Capacity (minutes)		
			Quota	Used	Available
day	-	-	2100	90	2010
time slot	08-12	-	1000	90	910
capacity category	08-12	MG	130	90	40
time slot	12-17	-	1200	0	1200
capacity category	12-17	MG	160	0	160

3.1.5 'get_capacity' Error Conditions

The 'get_capacity' operation returns Soap Faults in case of errors. Possible error conditions and corresponding Soap Faults are listed below.

3.1.5.1 'get_capacity' Error Codes

Each SOAP Fault contains the 'detail/errorCode' field containing one of error codes listed in the table below.

detail/errorCode	faultstring
2	Internal error
7	Authentication failed
8	Unknown location
9	Unknown work skill
10	Unknown time slot
11	Undefined key field
12	Unable to calculate work skill ID for given fields
13	Invalid value of key field
14	Unable to determine work zone for given fields
10009	'?' is not a valid DateTime value. Tag = date
10011	The mandatory 'location' field is not assigned. ParentTag = get_capacity

3.2 'get_quota_data' Method

This method is intended to extract all data available on the Quota View. It allows to:

- extract data from the 'day', 'time slot', and 'capacity category' levels using a single request
- define fields to be returned for each of these levels
- extract data for multiple buckets (separately or aggregated)
- extract data for multiple days
- calculate totals

3.2.1 'get_quota_data' Request

The 'get_quota_data' request contains the following parameters:

Name	Required	Type	Description
user	Yes	struct	'user' structure
date	Yes	date	date to be processed
resource_id	Yes	string	resource represented by external ID **Note**: results are only returned for capacity buckets or groups of capacity buckets
aggregate_results	No	bool	if multiple capacity buckets are selected, this option defines whether their results are to be aggregated (value set to '1') or returned individually (value set to '0'). **default value**: '0' The enabled 'aggregate_results' option restricts the list of quota parameters returned. When this option is enabled only the following parameters are returned: • 'quota' • 'max_available' • 'other_activities' • 'used' • 'count' • 'plan'
calculate_totals	No	bool	option defining whether totals are to be calculated and returned in the response (value set to '1'). The totals are calculated on the 'time_slot' and 'day' levels. **default value**: '0' Totals can be calculated for the following parameters: • 'quota' • 'max_available' • 'other_activities' • 'used' • 'count' • 'plan' If none of the above parameters are sent in the request, the response will contain an empty <total> element. The full total is calculated regardless of the 'time_slot' and 'category' filters.

time_slot	No	string	time slot filter defining the time slots (identified by labels) for which quota data is to be returned. When omitted, data for all time slots available for the specified capacity bucket is returned
category	No	string	capacity category filter defining the capacity categories (identified by labels) for which quota data is to be returned. When omitted, data for all capacity categories available for the specified capacity bucket is returned
day_quota_field	No	string	label of the field to be returned at the 'day' level. The following fields can be returned: • 'quota_percent' • 'min_quota' • 'quota' • 'status' • 'close_time' • 'closed_at' • 'max_available' • 'other_activities' • 'used' • 'used_quota_percent' • 'count'
time_slot_quota_field	No	string	label of the field to be returned at the 'time slot' level. The following fields can be returned: • 'quota_percent' • 'min_quota' • 'quota' • 'stop_booking_at' • 'status' • 'close_time' • 'closed_at' • 'max_available' • 'other_activities' • 'used' • 'used_quota_percent' • 'count'
category_quota_field	No	string	label of the field to be returned at the 'capacity category' level. The following fields can be returned: • 'quota_percent' • 'min_quota' • 'quota' • 'stop_booking_at' • 'weight' • 'estimated_quota_percent' • 'status' • 'close_time' • 'closed_at' • 'max_available'

			• 'used' • 'used_quota_percent' • 'count' • 'plan'
work_zone_quota_field	No	string	label of the field to be returned at the 'work zone' level. The following fields can be returned: • 'status' • 'close_time' • 'closed_at'

Note: a 'get_quota_data' request must contain at least one of the following fields: 'day_quota_field', 'time_slot_quota_field', 'category_quota_field', 'work_zone_quota_field'. Otherwise, the following SOAP fault is returned: "Bad request format – At least one of these fields must be present: 'day_quota_field', 'time_slot_quota_field', 'category_quota_field', 'work_zone_quota_field'".

3.2.1.1 'get_quota_data' Request Example

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ns1="urn:toa:capacity">
  <SOAP-ENV:Body>
    <ns1:get_quota_data>
      <user>
        <now>2014-01-27T15:53:43Z</now>
        <login>soap</login>
        <company>in132</company>
        <auth_string>cc4d2a2d3e18c3d1fef3ab0f32a3ea9a</auth_string>
      </user>
      <date>2014-02-04</date>
      <resource_id>routing</resource_id>
      <resource_id>planning</resource_id>
      <aggregate_results>0</aggregate_results>
      <calculate_totals>true</calculate_totals>
         <day_quota_field>quota</day_quota_field>
         <day_quota_field>status</day_quota_field>
         <day_quota_field>close_time</day_quota_field>
         <day_quota_field>max_available</day_quota_field>
         <day_quota_field>other_activities</day_quota_field>
         <day_quota_field>used</day_quota_field>
         <day_quota_field>used_quota_percent</day_quota_field>
         <day_quota_field>count</day_quota_field>
         <time_slot_quota_field>quota</time_slot_quota_field>
         <time_slot_quota_field>quota_percent</time_slot_quota_field>
         <time_slot_quota_field>min_quota</time_slot_quota_field>
         <time_slot_quota_field>status</time_slot_quota_field>
         <time_slot_quota_field>close_time</time_slot_quota_field>
         <time_slot_quota_field>max_available</time_slot_quota_field>
```

```
          <time_slot_quota_field>other_activities</time_slot_quota_field>
          <time_slot_quota_field>used</time_slot_quota_field>
          <time_slot_quota_field>used_quota_percent</time_slot_quota_field>
          <time_slot_quota_field>count</time_slot_quota_field>
          <category_quota_field>quota</category_quota_field>
          <category_quota_field>quota_percent</category_quota_field>
          <category_quota_field>close_time</category_quota_field>
          <category_quota_field>max_available</category_quota_field>
          <category_quota_field>used</category_quota_field>
          <category_quota_field>used_quota_percent</category_quota_field>
          <category_quota_field>count</category_quota_field>
          <category_quota_field>stop_booking_at</category_quota_field>
          <work_zone_quota_field>status</work_zone_quota_field>
          <work_zone_quota_field>close_time</work_zone_quota_field>
          <work_zone_quota_field>closed_at</work_zone_quota_field>
    </ns1:get_quota_data>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

3.2.2 'get_quota_data' Response

The 'get_quota_data' returns the Quota View data for the selected bucket or group of capacity buckets.

The 'get_quota_data' response contains one or several 'bucket' elements containing the properties of the specified bucket(s).

- **'bucket' Element of 'get_quota_data' Response**

Name	Type	Description
bucket_id	string	external ID of the capacity bucket. If the 'aggregate_results' option is returned, the 'bucket_id' field is not returned
name	string	name of the capacity bucket. If the 'aggregate_results' option is returned, the 'name' field is not returned
day	array	array of 'day' elements each containing the quota data for a single day

- **'day' Element of 'get_quota_data' Response**

Name	Type	Description
date	date	date for which the quota data is returned
quota_percent	float	quota value defined as percent (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'day' and 'Quota is entered' field is set to 'as % of capacity available by calendar' at the day level)
min_quota	int	minimum value of the quota (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'day' and 'Quota is

		entered' field is set to 'as % of capacity available by calendar' at the day level)
quota	int	quota value (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'day')

status	unsignedByte	status of the corresponding quota cell
		This field is a bitmask which contains the following flags:
		* 1 – Quota status is 'closed'
		* 4 – Quota is auto-closed
		* 8 – Quota was closed on a higher level
		* 16 – Quota is locked
		* 32 – Quota total is locked
		Individual bits can be checked using binary AND operator. For example in java/c++:
		status = 33; // binary '100001'
		if(status & 1) // bit 1 is set (Quota status is 'closed')
		if(status & 32) // bit 32 is set
		(returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'day')

close_time	DateTime	time when quota is to be closed automatically in the time zone of the selected capacity bucket. The 'close_time' field value contains both the date and time of quota closing in the YYYY-MM-DD HH:MM:SS format (returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'day')
closed_at	DateTime	time when quota was closed for the corresponding cell in the YYYY-MM-DD HH:MM:SS format (returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'day')
max_available	int	total working time of the resources in the capacity bucket on the selected day (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Estimate maximum capacity for' option is set for 'day')
other_activities	int	total travel time and duration of all activities which are not part of capacity management (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Estimate maximum capacity for' option is set for 'day' and the 'Estimate capacity used by activities that are not a part of the Quota Management' option is enabled at the day level)
used	int	used capacity (in minutes)
used_quota_percent	float	percentage of the daily quota currently used by the booked activities
count	int	number of booked activities
time_slot	array	array of 'time_slot' elements each containing the quota data for a single time slot
total	struct	total value calculated on the day level including all

		dependent time slots

- **'total' Element at 'Day' Level**

Name	Type	Description
quota	string	total quota value for the day including all dependent time slots (in minutes)
max_available	int	total working time of the resources in the capacity bucket on the selected day including all dependent time slots (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Estimate maximum capacity for' option is set for 'day')
other_activities	int	total travel time and duration of all activities which are not part of capacity management for the day (returned when in Manage Application → Settings → Resource Info the 'Estimate maximum capacity for' option is set for 'day' and the 'Estimate capacity used by activities that are not a part of the Quota Management' option is enabled at the day level)
used	int	total used capacity for the day (in minutes)
count	int	total number of booked activities for the day

If none of the above parameters are sent in the 'time_slot_quota_field' array of the request, the 'total' element will be empty.

- **'time_slot' Element of 'get_quota_data' Response**

Name	Type	Description
label	string	label of the time slot
quota_percent	float	quota value defined as percent (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'time slot' and the 'Quota is entered' field is set to 'as % of the maximum time slot capacity' or 'as % of the daily quota' at the time slot level)
min_quota	int	minimum value of the quota (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'time slot' and the 'Quota is entered' field is set to 'as % of the maximum time slot capacity' or 'as % of the daily quota' at the time slot level)
quota	int	quota value (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'time slot')
stop_booking_at	unsignedShort	percent of the used daily quota to stop booking activities at (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'time slot' and the 'Allow to close based on % of the daily quota that is currently in use' option is enabled)

status	unsignedByte	status of the corresponding quota cell
		This field is a bitmask which contains the following flags:
		* 1 – Quota status is 'closed'
		* 4 – Quota is auto-closed
		* 8 – Quota was closed on higher level
		* 16 – Quota is locked
		* 32 – Quota total is locked
		Individual bits can be checked using binary AND operator. For example in java/c++:
		status = 33; // binary '100001'
		if(status & 1) // bit 1 is set (Quota status is "closed")
		if(status & 32) // bit 32 is set
		(returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'time slot')

close_time	DateTime	time when quota is to be closed automatically in the time zone of the selected capacity bucket. The 'close_time' field value contains both the date and time of quota closing in the YYYY-MM-DD HH:MM:SS format (returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'time slot')
closed_at	DateTime	time when quota was closed for the corresponding cell in the YYYY-MM-DD HH:MM:SS format (returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'time slot')
max_available	int	maximum capacity available in the selected time slot (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Estimate maximum capacity for' field is set for 'time slot')
other_activities	int	total travel time and duration of all activities which are not part of capacity management and may affect capacity in the selected time slot (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Estimate maximum capacity for' field is set for 'time slot' and the 'Estimate capacity used by activities that might affect capacity in this time slot' option is enabled at the time slot level)
used	int	used capacity (in minutes)
used_quota_percent	float	percentage of the time slot quota currently used by the booked activities in the same time slot
count	int	number of booked activities
category	array	array of 'category' elements each containing the quota data for a single capacity category
total	array	total value calculated on the 'time slot' level' including all dependent capacity categories

- **'total' Element at 'Time Slot' Level**

Name	Type	Description

quota	string	total quota value for the time slot (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'time slot')
max_available	int	total maximum capacity available in the selected time slot (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Estimate maximum capacity for' field is set for 'time slot')
used	int	total used capacity in the selected time slot (in minutes)
count	int	total number of booked activities in the selected time slot
plan	int	total planned workload for the selected time slot received from the Forecasting module (returned when in Manage Application → Company Settings → Display the 'Enable Plan column that shows data set in Forecasting' option is enabled)

If none of the above parameters are sent in the 'category_quota_field' array of the request, the 'total' element will be empty.

- **'category' Element of 'get_quota_data' Response**

Name	Type	Description
label	string	label of the capacity category
quota_percent	float	quota value defined as percent (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'capacity category' and the 'Quota is entered' field is set to 'as % of the maximum capacity available in this category' or 'as % of the time slot quota' at the capacity category level)
min_quota	int	minimum value of the quota (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'capacity category' and the 'Quota is entered' field is set to 'as % of the maximum capacity available in this category' or 'as % of the time slot quota' at the capacity category level)
quota	int	quota value (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'capacity category')
stop_booking_at	unsignedShort	percent of the used time slot quota to stop booking activities at (returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'capacity category' and the 'Allow to close based on % of the daily quota that is currently in use' option is enabled at the capacity category level)
weight	float	weight of the capacity category calculated on the basis of historical data (returned when in Manage Application → Settings → Resource Info the 'Quota is entered' field is set for 'as % of time slot quota' and the 'Estimate quota based on historical data' option is enabled at the capacity category level)
estimated_quota_percent	float	estimated quota value (as percent) calculated on the basis of the 'weight' coefficient and the configuration of

		available resources on the selected day (returned when in Manage Application → Settings → Resource Info the 'Quota is entered' field is set for 'as % of time slot quota' and the 'Estimate quota based on historical data' option is enabled at the capacity category level)

status	unsignedByte	status of the corresponding quota cell
		This field is a bitmask which contains the following flags:
		* 1 – Quota status is "closed"
		* 4 – Quota is auto-closed
		* 8 – Quota was closed on higher level
		* 16 – Quota is locked
		* 32 – Quota total is locked
		Individual bits can be checked using binary AND operator. For example in java/c++:
		status = 33; // binary '100001'
		if(status & 1) // bit 1 is set (Quota status is "closed")
		if(status & 32) // bit 32 is set
		(returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'capacity category')

close_time	DateTime	time when quota is to be closed automatically in the time zone of the selected capacity bucket. The 'close_time' field value contains both the date and time of quota closing in the YYYY-MM-DD HH:MM:SS format (returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'capacity category')
closed_at	DateTime	time when quota was closed for the corresponding cell in the YYYY-MM-DD HH:MM:SS format (returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'capacity category')
max_available	int	maximum capacity available in the selected time slot and capacity category (in minutes) (returned when in Manage Application → Settings → Resource Info the 'Estimate maximum capacity for' field is set for 'capacity category')
used	int	used capacity (in minutes)
used_quota_percent	float	percentage of the capacity category quota currently used by the booked activities belonging to the same capacity category
count	int	number of booked activities
plan	int	planned workload received from the Forecasting module (returned when in Manage Application → Company Settings → Display the 'Enable Plan column that shows data set in Forecasting' option is enabled)
work_zone	array	array of properties containing the quota data for a work zone

- **'work_zone' Array of 'get_quota_data' Response**

Name	Type	Description

label	string	label of the work zone

status	unsignedByte	status of the corresponding quota cell
		This field is a bitmask which contains the following flags:
		* 1 – Quota status is "closed"
		* 2 – Quota status is "open"
		* 4 – Quota is auto-closed
		* 8 – Quota was closed on higher level
		* 16 – Quota is locked
		* 32 – Quota total is locked
		Individual bits can be checked using binary AND operator. For example in java/c++:
		status = 33; // binary '100001'
		if(status & 1) // bit 1 is set (Quota status is "closed")
		if(status & 32) // bit 32 is set
		(returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'work zone')

close_time	DateTime	time when quota is to be closed automatically in the time zone of the selected capacity bucket. The 'close_time' field value contains both the date and time of quota closing (returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'work zone')
closed_at	DateTime	time when quota was closed for the corresponding cell (returned when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'work zone')

3.2.2.1 'get_quota_data' Response Example

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ns1="urn:toa:capacity">
  <SOAP-ENV:Body>
    <ns1:get_quota_data_response>
      <bucket>
        <bucket_id>routing</bucket_id>
        <name>Planning</name>
            <day>
               <date>2014-02-04</date>
               <quota>456</quota>
               <close_time>2014-02-04 13:51:00</close_time>
               <max_available>24150</max_available>
               <other_activities>175</other_activities>
               <used>225</used>
               <used_quota_percent>49.34210526</used_quota_percent>
               <count>5</count>
               <time_slot>
                  <label>08-12</label>
                  <quota_percent>55</quota_percent>
```

```
                <min_quota>67</min_quota>
                <quota>251</quota>
                <status>4</status>
                <max_available>8400</max_available>
                <other_activities>47</other_activities>
                <used>90</used>
                <used_quota_percent>35.85657371</used_quota_percent>
                <count>2</count>
                <category>
                   <label>04</label>
                   <quota_percent>6.81818199</quota_percent>
                   <quota>9</quota>
                   <stop_booking_at>12</stop_booking_at>
                   <close_time>2014-02-04 23:30:00</close_time>
                   <max_available>5040</max_available>
                   <used>45</used>
                   <used_quota_percent>500</used_quota_percent>
                   <count>1</count>
                </category>
                <category>
                   <label>06</label>
                   <quota_percent>93.1818161</quota_percent>
                   <quota>123</quota>
                   <stop_booking_at>2</stop_booking_at>
                   <max_available>5280</max_available>
                   <used>45</used>
                   <used_quota_percent>36.58536585</used_quota_percent>
                   <count>1</count>
                   <work_zone>
                      <label>98</label>
                      <status>1</status>
                      <closed_at>2014-02-03 08:14:37</closed_at>
                   </work_zone>
                </category>
                <total>
                   <quota>132</quota>
                   <max_available>10320</max_available>
                   <used>90</used>
                   <count>2</count>
                </total>
             </time_slot>
             <time_slot>
                <label>12-17</label>
                <quota_percent>45</quota_percent>
                <min_quota>567</min_quota>
                <quota>567</quota>
                <close_time>2014-02-04 16:30:00</close_time>
```

```
                <max_available>10500</max_available>
                <other_activities>89</other_activities>
                <used>135</used>
                <used_quota_percent>23.80952381</used_quota_percent>
                <count>3</count>
                <category>
                   <label>04</label>
                   <quota_percent>91.76470947</quota_percent>
                   <quota>234</quota>
                   <stop_booking_at>7</stop_booking_at>
                   <max_available>6300</max_available>
                   <used>45</used>
                   <used_quota_percent>19.23076923</used_quota_percent>
                   <count>1</count>
                </category>
                <category>
                   <label>06</label>
                   <quota_percent>8.23529434</quota_percent>
                   <quota>21</quota>
                   <stop_booking_at>4</stop_booking_at>
                   <max_available>6600</max_available>
                   <used>90</used>
                   <used_quota_percent>428.57142857</used_quota_percent>
                   <count>2</count>
                </category>
                <total>
                   <quota>255</quota>
                   <max_available>12900</max_available>
                   <used>135</used>
                   <count>3</count>
                </total>
             </time_slot>
             <total>
                <quota>818</quota>
                <max_available>18900</max_available>
                <other_activities>136</other_activities>
                <used>225</used>
                <count>5</count>
             </total>
          </day>
       </bucket>
       <bucket>
          <bucket_id>planing</bucket_id>
          <name>planing 1</name>
          <day>
             <date>2014-02-04</date>
             <quota>1535</quota>
```

```
<max_available>540</max_available>
<other_activities>95</other_activities>
<used>180</used>
<used_quota_percent>11.72638437</used_quota_percent>
<count>4</count>
<time_slot>
   <label>08-12</label>
   <quota_percent>11.81959534</quota_percent>
   <quota>76</quota>
   <close_time>2014-02-04 20:30:00</close_time>
   <max_available>180</max_available>
   <other_activities>18</other_activities>
   <used>90</used>
   <used_quota_percent>118.42105263</used_quota_percent>
   <count>2</count>
   <category>
      <label>04</label>
      <quota_percent>45</quota_percent>
      <quota>34</quota>
      <max_available>180</max_available>
      <used>45</used>
      <used_quota_percent>132.35294118</used_quota_percent>
      <count>1</count>
      <work_zone>
         <label>98</label>
         <close_time>2014-02-04 22:00:00</close_time>
      </work_zone>
   </category>
   <category>
      <label>06</label>
      <quota_percent>55</quota_percent>
      <quota>42</quota>
      <stop_booking_at>456</stop_booking_at>
      <used>45</used>
      <used_quota_percent>107.14285714</used_quota_percent>
      <count>1</count>
   </category>
   <total>
      <quota>76</quota>
      <max_available>180</max_available>
      <used>90</used>
      <count>2</count>
   </total>
</time_slot>
<time_slot>
   <label>12-17</label>
   <quota_percent>88.18040466</quota_percent>
```

```
                    <quota>567</quota>
                    <max_available>300</max_available>
                    <other_activities>6</other_activities>
                    <used>90</used>
                    <used_quota_percent>15.87301587</used_quota_percent>
                    <count>2</count>
                    <category>
                       <label>04</label>
                       <quota_percent>66</quota_percent>
                       <quota>374</quota>
                       <stop_booking_at>12</stop_booking_at>
                       <max_available>300</max_available>
                       <used>45</used>
                       <used_quota_percent>12.03208556</used_quota_percent>
                       <count>1</count>
                    </category>
                    <category>
                       <label>06</label>
                       <quota_percent>34</quota_percent>
                       <quota>193</quota>
                       <stop_booking_at>546</stop_booking_at>
                       <used>45</used>
                       <used_quota_percent>23.31606218</used_quota_percent>
                       <count>1</count>
                    </category>
                    <total>
                       <quota>567</quota>
                       <max_available>300</max_available>
                       <used>90</used>
                       <count>2</count>
                    </total>
                 </time_slot>
                 <total>
                    <quota>643</quota>
                    <max_available>480</max_available>
                    <other_activities>24</other_activities>
                    <used>180</used>
                    <count>4</count>
                 </total>
              </day>
           </bucket>
     </ns1:get_quota_data_response>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

3.2.3 'get_quota_data' Error Codes

The error codes returned to the 'get_quota_data' request are listed below:

Code	Error Message Example
1	Service is unavailable
2	Internal error
7	Authentication failed
9	Unknown category: <label>
10	Unknown time slot: <label>
29	Not permitted
31	Invalid date: <value>
32	Unknown resource: <external id>
33	Unknown quota field: <label>

For the description of each error code please refer to Section 4.2, 'Error Codes'.

3.3 'set_quota' Method

The 'set_quota' method is used to set or update the quota parameters.

3.3.1 'set_quota' Request

The 'set_quota' request contains the following parameters:

Name	Required	Type	Description
user	Yes	struct	'user' structure
bucket	No	array	array of 'bucket' elements defining parameters of a single bucket to be set or updated in the operation

- **'bucket' Element of 'set_quota' Request**

Name	Required	Type	Description
bucket_id	Yes	string	external ID of the capacity bucket **Note**: results are only returned for capacity buckets or groups of capacity buckets
day	No	array	array of 'day' elements containing the quota data for a single day to be set or updated

- **'day' Element of 'set_quota' Request**

Name	Required	Type	Description
date	Yes	date	date for which data is to be updated in the YYYY-MM-DD format **valid values**: current date – 2999-12-31 **Note**: if no time zone difference is defined for the specified date, quota will not be updated
quota_percent	No	float	quota value defined as percent **valid values**: 0 – 999.99 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'day' and 'Quota is entered' field is set to 'as % of capacity available by calendar' at the day level
min_quota	No	int	minimum value of the quota (in minutes) **valid values**: 0 – 16,777,215 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'day' and 'Quota is entered' field is set to 'as % of capacity available by calendar' at the day level
quota	No	int	quota value (in minutes) **valid values**: 0 – 16,777,215 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'day'.
status	No	unsignedByte	status of the corresponding quota cell This field is a bitmask which contains the following flags: * 1 – Quota status is "closed"

			* 4 – Quota is auto-closed
			* 8 – Quota was closed on higher level
			* 16 – Quota is locked
			* 32 – Quota total is locked
			Individual bits can be checked using binary AND operator. For example in java/c++:
			status = 33; // binary '100001'
			if(status & 1) // bit 1 is set (Quota status is "closed")
			if(status & 32) // bit 32 is set
			Should only be sent when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'day'.

time_slot	No	array	array of 'time_slot' elements containing the quota data for a single time slot to be set or updated

- **'time_slot' Element of 'set_quota' Request**

Name	Required	Type	Description
label	Yes	string	label of the time slot
quota_percent	No	float	quota value defined as percent **valid values**: 0 – 999.99 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'time slot' and the 'Quota is entered' field is set to 'as % of the maximum time slot capacity' or 'as % of the daily quota' at the time slot level
min_quota	No	int	minimum value of the quota (in minutes) **valid values**: 0 – 16,777,215 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'time slot' and the 'Quota is entered' field is set to 'as % of the maximum time slot capacity' or 'as % of the daily quota' at the time slot level
quota	No	int	quota value (in minutes) **valid values**: 0 – 16,777,215 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'time slot'
stop_booking_at	No	unsignedShort	percent of the used daily quota to stop booking activities at **valid values**: 0 – 65,535 Should only be sent when in Manage Application → Settings → Resource Info he 'Quota is entered for' field is set to 'time slot' and the 'Allow to close based on % of the daily quota that is currently in use' option is enabled
status	No	unsignedByte	status of the corresponding quota cell This field is a bitmask which contains the following flags: * 1 – Quota status is "closed" * 4 – Quota is auto-closed

			* 8 – Quota was closed on higher level
			* 16 – Quota is locked
			* 32 – Quota total is locked
			Individual bits can be checked using binary AND operator. For example in java/c++:
			status = 33; // binary '100001'
			if(status & 1) // bit 1 is set (Quota status is "closed")
			if(status & 32) // bit 32 is set
			Should only be sent when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'time slot'

category	No	array	array of 'category' elements containing the quota data for a single capacity category to be set or updated

- **'category' Element of 'set_quota' Request**

Name	Required	Type	Description
label	Yes	string	label of the the capacity category
quota_percent	No	float	quota value defined as percent **valid values**: 0 – 999.99 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'capacity category' and the 'Quota is entered' field is set to 'as % of the maximum capacity available in this category' or 'as % of the time slot quota' at the capacity category level
min_quota	No	int	minimum value of the quota (in minutes) **valid values**: 0 – 16,777,215 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'capacity category' and the 'Quota is entered' field is set to 'as % of the maximum capacity available in this category' or 'as % of the time slot quota' at the capacity category level
quota	No	int	quota value (in minutes) **valid values**: 0 – 16,777,215 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota is entered for' field is set to 'capacity category'
stop_booking_at	No	unsignedShort	percent of the used daily quota to stop booking activities at **valid values**: 0 – 65,535 Should only be sent when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'capacity category' and the 'Allow to close based on % of the daily quota that is currently in use' option is enabled at the capacity category level
status	No	unsignedByte	status of the corresponding quota cell This field is a bitmask which contains the following flags: * 1 – Quota status is "closed" * 4 – Quota is auto-closed

			* 8 – Quota was closed on higher level
			* 16 – Quota is locked
			* 32 – Quota total is locked
			Individual bits can be checked using binary AND operator. For example in java/c++:
			status = 33; // binary '100001'
			if(status & 1) // bit 1 is set (Quota status is "closed")
			if(status & 32) // bit 32 is set
			Should only be sent when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'capacity category'

work_zone	No	array	array of 'work_zone' elements each containing the quota data for a single work zone to be set or updated

- **'work_zone' Element of 'set_quota' Request**

Name	Required	Type	Description
label	Yes	string	label of the the work zone

status	No	unsignedByte	status of the corresponding quota cell
			This field is a bitmask which contains the following flags:
			* 1 – Quota status is "closed"
			* 2 – Quota status is "open"
			* 4 – Quota is auto-closed
			* 8 – Quota was closed on higher level
			* 16 – Quota is locked
			* 32 – Quota total is locked
			Individual bits can be checked using binary AND operator. For example in java/c++:
			status = 33; // binary '100001'
			if(status & 1) // bit 1 is set (Quota status is "closed")
			if(status & 32) // bit 32 is set
			Should only be sent when in Manage Application → Settings → Resource Info the 'Quota can be closed for' field is set for 'work zone'

3.3.1.1 'set_quota' Request Example

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ns1="urn:toa:capacity">
  <SOAP-ENV:Body>
    <ns1:set_quota>
      <user>
        <now>2014-01-27T15:55:50Z</now>
        <login>soap</login>
        <company>in132</company>
        <auth_string>9493f8a6f0e7c44a3d2cd4ab86946066</auth_string>
      </user>
```

```
      <bucket>
        <bucket_id>routing</bucket_id>
        <day>
          <date>2014-01-27</date>
          <quota_percent>50</quota_percent>
          <min_quota>10</min_quota>
          <quota>100</quota>
          <status>0</status>
          <time_slot>
            <label>08-10</label>
            <quota_percent>50</quota_percent>
            <min_quota>10</min_quota>
            <quota>100</quota>
            <stop_booking_at>90</stop_booking_at>
            <status>0</status>
            <category>
              <label>UP</label>
              <quota_percent>50</quota_percent>
              <min_quota>10</min_quota>
              <quota>100</quota>
              <stop_booking_at>80</stop_booking_at>
              <status>0</status>
              <work_zone>
                <label>GENEVA</label>
                <status>1</status>
              </work_zone>
            </category>
          </time_slot>
        </day>
      </bucket>
      <bucket>
        <bucket_id>11106</bucket_id>
        <day>
          <date>2014-01-27</date>
          <quota_percent>50</quota_percent>
          <min_quota>10</min_quota>
          <quota>100</quota>
          <status>0</status>
          <time_slot>
            <label>08-10</label>
            <quota_percent>50</quota_percent>
            <min_quota>10</min_quota>
            <quota>100</quota>
            <stop_booking_at>90</stop_booking_at>
            <status>0</status>
            <category>
              <label>UP</label>
```

```
              <quota_percent>50</quota_percent>
              <min_quota>10</min_quota>
              <quota>100</quota>
              <stop_booking_at>80</stop_booking_at>
              <status>0</status>
              <work_zone>
                <label>GENEVA</label>
                <status>1</status>
              </work_zone>
            </category>
          </time_slot>
        </day>
      </bucket>
    </ns1:set_quota>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

3.3.2 'set_quota' Response

The 'set_quota' response includes one or several 'result' elements containing the following data for a single bucket:

Name	Type	Description
bucket_id	string	external ID of the capacity bucket (absent if the whole transaction failed)
date	date	date for which quota was set or updated in the YYYY-MM-DD format If not returned, the transaction is successful for the specified bucket.
time_slot	string	label of the time slot for which quota was set or updated If not returned, the rule defines that quota should be set on the day level. In this case the record contains no 'category' and 'work_zone' fields either.
category	string	label of the capacity category for which quota was set or updated If not returned, the rule defines that quota should be set on the time slot level.
work_zone	string	label of the work zone for which quota was set or updated If not returned, the rule defines that quota should be set on the capacity category level.
result_code	int	result of the performed operation 'result_code' is returned in every 'result' element For a successful transaction 'result_code' = 0 is returned. If transaction fails, the 'result_code' > 0.
error_msg	string	text description of the error 'error_msg' is returned only if 'result_code' is other than 0

3.3.2.1 'set_quota' Response Example

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ns1="urn:toa:capacity">
  <SOAP-ENV:Body>
```

```
    <ns1:set_quota_response>
      <result>
        <bucket_id>routing</bucket_id>
        <result_code>0</result_code>
      </result>
      <result>
        <bucket_id>routing</bucket_id>
        <date>2014-01-27</date>
        <result_code>0</result_code>
      </result>
      <result>
        <bucket_id>routing</bucket_id>
        <date>2014-01-27</date>
        <time_slot>08-10</time_slot>
        <result_code>0</result_code>
      </result>
      <result>
        <bucket_id>routing</bucket_id>
        <date>2014-01-27</date>
        <time_slot>08-10</time_slot>
        <category>UP</category>
        <result_code>0</result_code>
      </result>
      <result>
        <bucket_id>routing</bucket_id>
        <date>2014-01-27</date>
        <time_slot>08-10</time_slot>
        <category>UP</category>
        <result_code>0</result_code>
      </result>
      <result>
        <bucket_id>11106</bucket_id>
        <result_code>2</result_code>
        <error_msg>Unknown capacity bucket</error_msg>
      </result>
    </ns1:set_quota_response>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

3.3.3 'set_quota' Error Codes

The error codes returned to the 'set_quota' request are listed below:

Code	Error Message Example
2	Internal error
7	Authentication failed
9	Unknown category: <label>
10	Unknown time slot: <label>
29	Not permitted
31	Invalid date: <value>
34	Date is in past
35	Unable to determine time zone difference
36	Unknown work zone: <label>
37	Unknown capacity bucket
38	Invalid quota percent value
39	Quota percent is not supported
40	Invalid min quota value
41	Min quota is not supported
42	Invalid quota value
43	Quota is not supported
44	Invalid quota status value
45	Close quota is not supported
46	Invalid '% to stop booking at' value
47	'% to stop booking at' is not supported

For the description of each error code please refer to Section 4.2, 'Error Codes'.

3.4 'get_quota_close_time' Method

The 'get_quota_close_time' method is used to retrieve the time when quota is to be closed automatically.

3.4.1 'get_quota_close_time' Request

The 'get_quota_close_time' request contains the following parameters:

Name	Required	Type	Description
user	Yes	struct	'user' structure
bucket_id	Yes	string	external ID of the capacity bucket **Note**: results are only returned for capacity buckets or groups of capacity buckets
day_offset	No	unsignedByte	offset of the day the quota should be closed for **valid values**: 0 – 255 If omitted, all rules are returned regardless of the days on which they should be applied
time_slot	No	string	time slot filter defining the time slots (identified by labels) for which quota close time is to be returned. When omitted, close time for all time slots available for the specified capacity bucket is returned
category	No	string	capacity category filter defining the capacity categories (identified by labels) for which quota close time is to be returned. When omitted, close time for all capacity categories available for the specified capacity bucket is returned
work_zone	No	string	work zone filter defining the work zones (identified by labels) for which quota close time is to be returned. When omitted, close time for all work zones available for the specified capacity bucket is returned

3.4.1.1 'get_quota_close_time' Request Example

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ns1="urn:toa:capacity">
  <SOAP-ENV:Body>
    <ns1:get_quota_close_time>
      <user>
        <now>2014-01-27T15:56:59Z</now>
        <login>soap</login>
        <company>in132</company>
        <auth_string>e8fe873cc5dd62e7eba52d620f5be797</auth_string>
      </user>
      <bucket_id>routing</bucket_id>
    </ns1:get_quota_close_time>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

3.4.2 'get_quota_close_time' Response

The 'get_quota_close_time' response includes one or several 'close_schedule' elements containing the following data for a single quota cell:

Name	Type	Description
bucket_id	string	external ID of the capacity bucket
day_offset	unsignedByte	offset of the day the quota should be closed for (the returned values are in the range of 0 – 255)
time_slot	string	label of the time slot to be closed If not returned, the rule defines the time when quota should be closed on the day level. In this case the record contains no 'category' and 'work_zone' fields either.
category	string	label of the capacity category to be closed If not returned, the rule defines the time when quota should be closed on the time slot level. In this case the record contains no 'work_zone' field either.
work_zone	string	label of the work zone to be closed If not returned, the rule defines the time when quota should be closed on the capacity category level.
close_time	time	time in the time zone of the capacity bucket at which quota should be closed in the HH:MM:SS format

3.4.2.1 'get_quota_close_time' Response Example

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ns1="urn:toa:capacity">
  <SOAP-ENV:Body>
    <ns1:get_quota_close_time_response>
      <close_schedule>
        <bucket_id>routing</bucket_id>
        <day_offset>1</day_offset>
        <time_slot>08-10</time_slot>
        <category>UP</category>
        <work_zone>HEATHROW</work_zone>
        <close_time>12:00:00</close_time>
      </close_schedule>
      <close_schedule>
        <bucket_id>routing</bucket_id>
        <day_offset>2</day_offset>
        <time_slot>08-10</time_slot>
        <category>IN</category>
        <work_zone>SANFORD</work_zone>
        <close_time>13:00:00</close_time>
      </close_schedule>
    </ns1:get_quota_close_time_response>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

3.4.3 'get_quota_close_time' Error Codes

The error codes returned to the 'get_quota_close_time' request are listed below:

Code	Error Message Example
1	Service is unavailable
2	Internal error
7	Authentication failed
9	Unknown category: <label>
10	Unknown time slot: <label>
29	Not permitted
36	Unknown work zone: <label>
37	Unknown capacity bucket
45	Close quota is not supported
48	Inconsistent data

For the description of each error code please refer to Section 4.2, 'Error Codes'.

3.5 'set_quota_close_time' Method

The 'set_quota_close_time' method is used to set or update the time when quota is to be closed automatically.

NOTE: quota close time can only be set at the levels specified in the capacity bucket configuration (Manage Application → Resource Info → Quota can be closed for).

3.5.1 'set_quota_close_time' Request

The 'set_quota_close_time' request consists of one or several 'close_schedule' elements containing the following data for a single quota cell:

Name	Required	Type	Description
user	Yes	struct	'user' structure
bucket_id	Yes	string	external ID of the capacity bucket
day_offset	No	unsignedByte	offset of the day the quota should be closed for **valid values**: 0 – 255 **default value**: 0 (current day)
time_slot	No	string	label of the time slot to be closed If omitted, quota is to be closed on the day level. In this case the request should not contain the 'category' and 'work_zone' fields, either.
category	No	string	label of the capacity category to be closed If omitted, quota is to be closed on the time slot level. In this case the request should not contain the 'work_zone' field, either.
work_zone	No	string	label of the work zone to be closed If omitted, quota is to be closed on the 'capacity category' level.
close_time	No	time	time in the time zone of the capacity bucket at which quota should be closed in the HH:MM:(SS) format If omitted, the existing close time is deleted.

3.5.1.1 'set_quota_close_time' Request Example

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ns1="urn:toa:capacity">
  <SOAP-ENV:Body>
    <ns1:set_quota_close_time>
      <user>
        <now>2014-01-27T15:56:59Z</now>
        <login>soap</login>
        <company>in132</company>
        <auth_string>e8fe873cc5dd62e7eba52d620f5be797</auth_string>
      </user>
      <close_schedule>
        <bucket_id>invalid_bucket</bucket_id>
        <day_offset>1</day_offset>
```

```
        <time_slot>08-10</time_slot>
        <category>UP</category>
        <work_zone>HEATHROW</work_zone>
        <close_time>12:00</close_time>
      </close_schedule>
      <close_schedule>
        <bucket_id>routing</bucket_id>
        <day_offset>1</day_offset>
        <time_slot>invalid_time_slot</time_slot>
        <category>UP</category>
        <work_zone>HEATHROW</work_zone>
        <close_time>12:00</close_time>
      </close_schedule>
      <close_schedule>
        <bucket_id>routing</bucket_id>
        <day_offset>1</day_offset>
        <time_slot>08-10</time_slot>
        <category>UP</category>
        <work_zone>HEATHROW</work_zone>
        <close_time>12:00</close_time>
      </close_schedule>
      <close_schedule>
        <bucket_id>routing</bucket_id>
        <day_offset>1</day_offset>
        <time_slot>08-10</time_slot>
        <category>invalid_category</category>
        <work_zone>HEATHROW</work_zone>
        <close_time>12:00</close_time>
      </close_schedule>
      <close_schedule>
        <bucket_id>routing</bucket_id>
        <day_offset>2</day_offset>
        <time_slot>08-10</time_slot>
        <category>IN</category>
        <work_zone>SANFORD</work_zone>
        <close_time>13:00</close_time>
      </close_schedule>
      <close_schedule>
        <bucket_id>routing</bucket_id>
        <day_offset>1</day_offset>
        <time_slot>08-10</time_slot>
        <category>UP</category>
        <work_zone>invalid_workzone</work_zone>
        <close_time>12:00</close_time>
      </close_schedule>
    </ns1:set_quota_close_time>
  </SOAP-ENV:Body>
```

```
</SOAP-ENV:Envelope>
```

3.5.2 'set_quota_close_time' Response

The 'set_quota_close_time' response includes one or several 'result' elements containing the result of operation of setting close time for a single quota cel. Each element consists of the following fields:

Name	Type	Description
bucket_id	string	external ID of the capacity bucket
day_offset	unsignedByte	offset of the day for which quota should be closed **values range**: 0 – 255
time_slot	string	label of the time slot for which quota should be closed If not returned, the rule defines the time when quota should be closed on the day level. In this case the record contains no 'category' and 'work_zone' fields either.
category	string	label of the capacity category for which quota should be closed If not returned, the rule defines the time when quota should be closed on the time slot level. In this case the record contains no 'work_zone' field either.
work_zone	string	label of the work zone for which quota should be closed If not returned, the rule defines the time when quota should be closed on the time slot level.
result_code	int	result of the performed operation 'result_code' is returned in every 'result' element For a successful transaction 'result_code' = 0 is returned. If transaction fails, the 'result_code' > 0.
error_msg	string	text description of the error 'error_msg' is returned only if 'result_code' is other than 0

3.5.2.1 'set_quota_close_time' Response Example

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ns1="urn:toa:capacity">
  <SOAP-ENV:Body>
    <ns1:set_quota_close_time_response>
      <result>
        <bucket_id>invalid_bucket</bucket_id>
        <day_offset>1</day_offset>
        <time_slot>08-10</time_slot>
        <category>UP</category>
        <work_zone>HEATHROW</work_zone>
        <result_code>37</result_code>
        <error_msg>Unknown capacity bucket</error_msg>
      </result>
      <result>
        <bucket_id>routing</bucket_id>
        <day_offset>1</day_offset>
```

```
        <time_slot>invalid_time_slot</time_slot>
        <category>UP</category>
        <work_zone>HEATHROW</work_zone>
        <result_code>10</result_code>
        <error_msg>Unknown time slot</error_msg>
      </result>
      <result>
        <bucket_id>routing</bucket_id>
        <day_offset>1</day_offset>
        <time_slot>08-10</time_slot>
        <category>UP</category>
        <work_zone>HEATHROW</work_zone>
        <result_code>0</result_code>
      </result>
      <result>
        <bucket_id>routing</bucket_id>
        <day_offset>1</day_offset>
        <time_slot>08-10</time_slot>
        <category>invalid_category</category>
        <work_zone>HEATHROW</work_zone>
        <result_code>9</result_code>
        <error_msg>Unknown category</error_msg>
      </result>
      <result>
        <bucket_id>routing</bucket_id>
        <day_offset>2</day_offset>
        <time_slot>08-10</time_slot>
        <category>IN</category>
        <work_zone>SANFORD</work_zone>
        <result_code>0</result_code>
      </result>
      <result>
        <bucket_id>routing</bucket_id>
        <day_offset>1</day_offset>
        <time_slot>08-10</time_slot>
        <category>UP</category>
        <work_zone>invalid_workzone</work_zone>
        <result_code>36</result_code>
        <error_msg>Unknown work zone</error_msg>
      </result>
    </ns1:set_quota_close_time_response>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

3.5.3 'set_quota_close_time' Error Codes

The error codes returned to the 'set_quota_close_time' request are listed below:

Code	Error Message Example
2	Internal error
7	Authentication failed
9	Unknown category: <label>
10	Unknown time slot: <label>
29	Not permitted
36	Unknown work zone: <label>
37	Unknown capacity bucket
45	Close quota is not supported
48	Inconsistent data

For the description of each error code please refer to Section 4.2, 'Error Codes'.

4 Transaction Errors

If an error occurs in the course of transaction processing, such that operation cannot be completed, then Soap Fault is returned.

Additionally for batch operations ('set_quota', 'set_quota_close_time') an operation may be partially successful. In this case normal response is returned, with an array of 'result' elements, each containing an individual result.

4.1 SOAP Faults

Capacity Management API returns standard SOAP Fault in case of errors. Soap Fault contains the following fields:

Soap Fault field	Possible values of this field	Description
faultcode	• Client • Server	This field is always returned. • Client – means that the problem is with the request – either request has incorrect format, or invalid authentication info is supplied etc. • Server – means that the problem is on ETAdirect side.
faultstring	• Authentication Failed • Unknown location • Bad request format • etc	This field is always returned. It contains human-readable description of error
faultactor	• DISPATCHER • get_capacity • <absent>	This field is optional. This field is for diagnostic purposes and may be ignored by the Client Application. It signifies which part of ETAdirect system generated the Soap Fault.
detail	element containing children: errorCode, errorDetail	This field is optional. This field contains ETAdirect specific subfields: errorCode, errorDetail.
detail/errorCode	integer	This field is optional. When present, it contains one of error codes listed in section 4.2 below. This field is meant to be machine-readable and meaning of existing error codes will not change. When this field is absent – it is because the request did not reach the destination endpoint. For example – failed due to invalid xml in request, or the destination service is temporary not available.

Soap Fault field	Possible values of this field	Description
detail/errorDetail	string	This field is optional. When present, it contains additional information related to errorCode and faultstring. For example, when errorCode is '8' and faultstring is 'Unknown location' the errorDetail field contains the label of capacity bucket which was passed in the request.

- **SOAP Fault Example**

```
<?xml version="1.0"?>
<SOAP-ENV:Envelope xmlns:SOAP-
ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Body>
    <SOAP-ENV:Fault>
      <faultcode>SOAP-ENV:Client</faultcode>
      <faultstring>Unknown location</faultstring>
      <faultactor>get_capacity</faultactor>
      <detail>
        <errorCode>8</errorCode>
        <errorDetail>routi2ng</errorDetail>
      </detail>
    </SOAP-ENV:Fault>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

4.2 Error Codes

Code	Error Message Example	Description
0		no error. Request has been successfully processed
1	Service is unavailable	the application server is unavailable
2	Internal error	the error is returned by another module
7	Authentication failed	user authentication was unsuccessful
9	Unknown category: <label>	the system is unable to find the capacity category using the given label
10	Unknown time slot: <label>	the system is unable to find the time slot using the given label
11	Undefined key field	if 'calculate_duration'=1 and/or 'calculate_travel_time'=1, then 'get_capacity' method tries to calculate activity duration and/or travel time based on 'activity_field' passed in the request

Code	Error Message Example	Description
		The error is returned if 'get_capacity' cannot calculate duration and/or travel time. 'detail' field of the fault contains the field which must be present in the request to determine duration or travel time. **Solution:** consult the support team on the fields which must be passed to calculate the duration and/or travel time
12	Unable to calculate work skill ID for given fields	if 'calculate_work_skill'=1 and 'work_skill' is not present in the request, then 'get_capacity' tries to calculate the work skill based on the 'activity_field' passed in the request This error is returned if 'get_capacity' cannot calculate the work skill. **Solution:** consult support team on the fields which must be passed to calculate the work skill
13	Invalid value of key field	value of 'worktype_label' or other 'activity_field' parameter is invalid
14	Unable to determine work zone for given fields	'determine_location_by_work_zone' is 'true' but the work zone cannot be found from the provided activity fields, therefore, no capacity bucket can be determined
29	Not permitted	the capacity bucket is not accessible for the current user
31	Invalid date: <value>	he system is unable to convert the sent string to a date value
32	Unknown resource: <external id>	the system is unable to find the resource using the given ID
33	Unknown quota field: <label>	the system is unable to find the quota field using the given label
34	Date is in past	quota for a past date cannot be updated
35	Unable to determine time zone difference	the system is unable to determine the time zone difference for the given date
36	Unknown work zone: <label>	the system is unable to find the work zone using the given label
37	Unknown capacity bucket	the system is unable to find the capacity bucket using the given external ID
38	Invalid quota percent value	the system is unable to convert the given string to the valid quota percent value
39	Quota percent is not supported	configuration of the capacity bucket does not support direct modification of the quota percent value
40	Invalid min quota value	the system is unable to convert the given string to a valid 'min_quota' parameter value
41	Min quota is not supported	configuration of the capacity bucket does not support the 'min_quota' parameter
42	Invalid quota value	the system is unable to convert the given string to a valid quota value
43	Quota is not supported	configuration of the capacity bucket does not

Code	Error Message Example	Description
		support direct modification of the quota value
44	Invalid quota status value	the system is unable to convert the given string to a valid 'status' parameter value
45	Close quota is not supported	configuration of the capacity bucket does not support closing of quota on the selected level
46	Invalid '% to stop booking at' value	the system is unable to convert the given string to a valid '% to stop booking at' parameter value
47	'% to stop booking at' is not supported	configuration of the capacity bucket does not support direct modification of the '% to stop booking at' parameter values
48	Inconsistent data	the request contains a combination of the 'time_slot_label', 'category_label', and 'work_zone_label' fields which is not allowed
10009	'?' is not a valid DateTime value. Tag = date	'date' parameter format is invalid the date format should be YYYY-MM-DD '**?**' = actual value passed in request **Note:** if a valid date is passed for which the capacity is not known (e.g. 1900-01-01), then no error will be returned but the response will be empty.
	'?' is not a valid Enum value. Tag = calculate_duration	'calculate_duration', 'calculate_travel_time', 'calculate_work_skill' are boolean and must have values {1 , 0 , true , false} Any other will cause an error. '**?**' = is the actual value passed in request
	'?' is not a valid Enum value. Tag = calculate_travel_time	
	'?' is not a valid Enum value. Tag = calculate_work_skill	
10011	The mandatory 'location' field is not assigned. ParentTag = get_capacity	The request contains no mandatory 'location' or 'date' parameters
	The mandatory 'date' field is not assigned. ParentTag = get_capacity	

5 Previous Versions

In version 4.5 the Capacity Management API has been enhanced by adding the following options:

- option defining whether the time slot node containing its name, label and time interval is to be returned has been added
- option defining whether the capacity bucket is to be determined by the work zone of the activity has been added
- option defining whether the results for different buckets within the same request are to be aggregated has been added
- parameter defining the minimum remaining time of the time slot has been introduced
- possibility of defining the default activity duration has been added

Four new methods have been added:

- get_quota_data
- set_quota
- get_quota_close_time
- set_quota_close_time