

MTAS Time Based Services Management Guide

MTAS

USER GUIDE

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1 Introduction

This document describes how to configure the Time Based Services in the MTAS.

1.1 Prerequisites

It is assumed that the user of this document is familiar with the O&M area, in general.

1.1.1 Licenses

There is no license dependency for the Time Based services.

1.1.2 Documents

Before starting any procedure in this document, ensure that the following documents are available:

- Ericsson Command-Line Interface User Guide
- Managed Object Model (MOM)

1.1.3 Conditions

The following condition must apply:

An Ericsson Command-Line Interface (ECLI) session in Exec mode is in progress.





2 Overview

The term Time Based Services is a reference to all MTAS services that implement time and calendar-dependent behaviors.

The configuration of time-dependent behavior spread over three levels in MTAS:

- **Data common for all the users handled by MTAS**

Such data is managed as CM attributes

- **Data common for all services of one user**

Such data is managed within the User Common Data. The User Common Data is a "quasi" service holding user data common for more than one service

- **Data valid for only one specific condition of one specific rule in the service document of the user**

Such data is set within the condition

Note: Some data can be specified in more than one level (namespace). For such data, always the one from the lowest level is used.

The configuration of the time-based services consists of the following subfunctions:

- Managing UTC Offset
- Managing Start Day of the Week
- Managing Workdays and Non-Workdays
- Managing Private and Public Holidays
- Subscription Rules with conditions
 - `cp:validity`
 - `mmt-serv:invalidity`
 - `mmt-serv:valid-periods`





3 Time Based Services Configuration

This section describes how to configure Time Based Services.

3.1 MTAS Calendar Data for Time Based Services Configuration

The Calendar Data used by Time Based Services in MTAS is controlled by the `MtasMmtCal` MO and its attributes. The MO structure of the MTAS Calendar Data is shown in Figure 1.

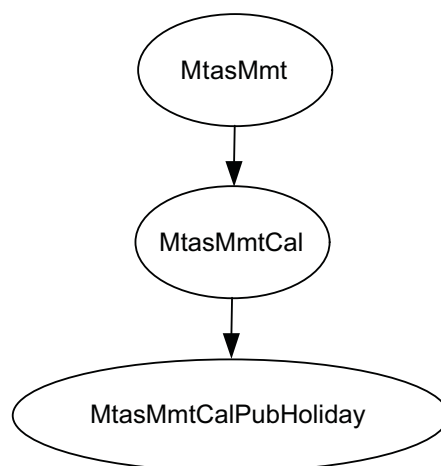


Figure 1 MtasMmtCal MO Structure

For configurable MOs and attributes related to the MTAS Calendar Data, refer to Managed Object Model (MOM).

3.2 Wholesale for Time Based Services Configuration

The Time Based Services supports Wholesale. Time Based Services are configurable on Virtual Telephony Provider level.

For every announcement attribute in the `MtasMmtCal` MO, there exists a corresponding attribute in the `VtasMmtCal` MO. To activate Wholesale for the Time Based Services, attributes in the `VtasMmtCal` MO need to configure and the `vtasMmtCalDropBack` attribute set to 0 (Use own VTP values).

For more information about the Wholesale service, refer to MTAS Wholesale Support Management Guide





4 Service Data Configuration

This section describes how to configure the service data.

4.1 Operator Subscription Level Service Configuration

The operator can activate or deactivate the fine-grained service subscriptions for the time-based conditions (for services requiring it) and activate or deactivate the holiday-list element for the subscriber by setting the user data using the CAI3G protocol.

For more information about the CAI3G protocol, refer to [MTAS CAI3G Interface](#)

4.2 Subscriber Subscription Level Service Configuration

The user subscriber data is configured through the Ut interface. The subscriber can configure the User Common Data and the time-based conditions for Time Based Services.

The Ut interface and the XML schema for the Ut interface are described in the following documents:

- [MTAS Ut Interface](#)
- [MTAS Ut Structure](#)





5 UTC Offset Configuration

This section describes how to configure the UTC offset.

5.1 UTC Offset

The UTC Offset defines the relative difference in time between UTC time and the MTAS node local time. For example, If node local time of MTAS is defined in the Central European Time Zone (CET) UTC+1, then the UTC Offset is set to value +01:00. The UTC Offset attribute is needed in case the time-based conditions of served subscribers are defined in local time of the subscriber. A prerequisite is that all time zones, in which MTAS serves subscribers, apply same daylight saving time (DST) modification (if any). The MTAS node local time is automatically DST-adjusted owing to build in IANA Time Zone Database information.

The UTC Offset can be managed at three levels:

- Within the Time Based Conditions
- Within the User Common Data by the <utc-offset> Element
- By the CM Attribute `mtasMmtCalUtcOffset`

5.1.1 Within the Time Based Conditions

When the UTC Offset is set within a condition, the corresponding value is applicable only to that condition. For example, when the UTC Offset is set within a condition, see Section 9.2 Cp:Validity on page 17, Section 9.3 Mmt-Serv:Invalidity on page 18 and Section 9.4.1 Mmt-Serv:Utc-Offset on page 20.

5.1.2 Within the User Common Data by the <utc-offset> Element

When the UTC Offset is set in the User Common Data, then the corresponding value is applicable to all time-based conditions of all services, except the conditions that have UTC Offset provisioned.

Example of UTC Offset in the User Common Data is shown in Example 1:

```
<mtt-serv:user-common-data>  
  <mtt-serv:utc-offset>+01:00</mtt-serv:utc-offset>  
</mtt-serv:user-common-data>
```

Example 1 UTC Offset



5.1.3 By the CM Attribute `mtasMmtCalUtcOffset`

The `mtasMmtCalUtcOffset` defines the offset to be taken from UTC during evaluation of time related service rule conditions.

When the UTC Offset is set by the CM attribute `mtasMmtCalUtcOffset`, then the corresponding value is applicable to all users, except the one who has the UTC Offset provisioned in the User Common Data.

With following provision a time-based condition for the CDIV service, using local time in the XML, as shown in Example 2:

```
<mc:validity>
  <mc:interval from="2016-06-15T14:20:00">
    <mc:from>2016-06-15T14:20:00</mc:from>
    <mc:until>2016-06-15T14:45:59</mc:until>
  </mc:interval>
</mc:validity>
```

Example 2 Time-based Condition for CDIV Service

When the validity period is given in local time format, the UTC offset is taken from the user-common-data. If the UTC offset is not provisioned for the user, the value from the CM attribute `mtasMmtCalUtcOffset` is used.

Note:

- When setting the value of these attributes, the Daylight Saving Time correction has to be considered as well.
- The recommended way of specifying time is to use local time format in the condition and use the UTC offset from the CM attribute `mtasMmtCalUtcOffset`.



6 Start Day of the Week Configuration

This section describes how to configure the start day of the week.

6.1 Start Day of the Week

The Start Day of the Week specifies the starting day of the week. This attribute is used when evaluating time-based conditions using calendar weeks or weekly repetition, see Section 9.4.5 Mmt-Serv:Valid-Weeks on page 22 and Section 9.4.7 Mmt-Serv:Repeat-Weekly on page 23.

The Start Day of the Week also serves as base of determining the calendar week number.

The start day of the week is Monday, and the week number 1 (W01) is the first week with at least 4 days from the new year according to:[ISO 8601 Data Elements and Interchange Formats - Representation of Dates and Times](#)

However, several areas of the world are using different conventions for the calendar weeks, see Table 1.

Table 1 Calendar Week Conventions

First Day of Week	First Week of Year Contains			Weeks Assigned Twice	Used by/in
Monday	4 January	First Thurs day	4–7 days of the year	No	Most of Europe and countries adhering to ISO 8601
Saturday	1 January	First Friday	1–7 days of the year	Yes	Much of the Middle East
Sunday	1 January	First Saturday	1–7 days of the year	Yes	Canada, USA

In MTAS when the Start Day of the Week is set to Monday as defined by ISO 8601, the calendar week numbering scheme also follows ISO 8601. If any other weekday is selected as Start Day of the Week, the traditional calendar week numbering scheme is used, that is the first week of the year is the week of 1st of January. The Start Day of the Week can be managed in two levels:



6.1.1 Configuration Within the User Common Data by the <start-day-of-week> Element

When the Start Day of the Week is set in the User Common Data, then the corresponding value is applicable to all time-based conditions of all services.

Example of Start Day of the Week in the User Common Data is shown in Example 3:

```
<mtt-serv:user-common-data>  
  <mtt-serv:start-day-of-week>Sunday</mtt-serv:start-day-of-week>  
</mtt-serv:user-common-data>
```

Example 3 Start Day

6.1.2 Configuration by the CM Attribute mttMttCalStartDayOfWeek

When the Start Day of the Week is set by the CM attribute mttMttCalStartDayOfWeek, then the corresponding value is applicable to all users, except the one who has the Start Day of the Week provisioned in the User Common Data.



7 Workdays and Non-Workdays Configuration

This section describes how to configure the workdays and non-workdays.

7.1 Workdays and Non-Workdays

In the Valid Periods condition, it is possible to use the Workdays and Non-Workdays shorthand instead of the explicit list of weekdays.

The Non-Workdays are configured as a list of weekdays. The Workdays are defined as weekdays not included in the list of Non-Workdays.

The list of Non-Workdays can be managed in two levels:

7.1.1 Configuration Within the User Common Data by the <non-workday-list> Element

When the list of Non-Workdays is set in the User Common Data, then it is applicable to all time-based conditions of all services. Example of the list of Non-Workdays in the User Common Data is shown in Example 4:

```
<mmt-serv:user-common-data>
  <mmt-serv:non-workday-list>
    <mmt-serv:weekday>Thursday</mmt-serv:weekday>
    <mmt-serv:weekday>Friday</mmt-serv:weekday>
  </mmt-serv:non-workday-list>
</mmt-serv:user-common-data>
```

Example 4 UTC Offset

7.1.2 Configuration by the CM Attribute MtasMmtCalNonWorkday

When the list of Non-Workdays is set by the CM attribute `mtasMmtCalNonWorkday`, then it is applicable to all users, except the one who has the list of Non-Workdays provisioned in the User Common Data.

For description of the Workday and Non-Workdays shorthand use, see Section 9.4.2 Mmt-Serv:Valid-Days on page 20.





8 Private and Public Holidays Configuration

This section describes how to configure the private and public holidays.

8.1 Private and Public Holidays

In the Valid Periods condition, it is possible to specify that the condition is fulfilled on Holidays, see Section 9.4.2 Mmt-Serv:Valid-Days on page 20. It is also possible to specify that the Holidays are exemptions, see Section 9.4.10 Except-Holidays on page 25.

The Holidays are defined as a list of absolute days (YYYY-MM-DD) and consist of two sets of days:

8.1.1 List of Private Holidays

The list of Private Holidays is configured in the User Common Data.

Example of the list of Private Holidays in the User Common Data is shown in Example 5 :

```
<mmt-serv:user-common-data>
  <mmt-serv:holiday-list use-national="false">
    </mmt-serv:holiday>2010-09-29<mmt-serv:holiday>
    </mmt-serv:holiday>2010-10-22<mmt-serv:holiday>
  </mmt-serv:holiday-list>
</mmt-serv:user-common-data>
```

Example 5 Private Holidays

8.1.2 List of Public Holidays

The list of the Public Holidays is configured by the `MtasMmtCalPubHoliday` MO.

The inheritance of the public holidays to the time-based conditions of the user is specified in the User Common Data.

How to configure when the user would like to use the Public Holidays without adding Private Holidays to the list, is shown in Example 6:

```
<mmt-serv:user-common-data>
  <mmt-serv:holiday-list use-national="true">
    <mmt-serv:holiday-list>
  </mmt-serv:holiday-list>
</mmt-serv:user-common-data>
```

Example 6 Public Holidays



The user can use the Holiday List (both for Public and Private Holidays) only when it is activated in the operator part of the User Common Data, see Example 7 for the activation using CAI3G:

```
<mc:holiday-list>activated</mc:holiday-list>
```

Example 7 Public and Private Holidays



9 Subscription Rules

This section describes how to configure the subscription Rules.

9.1 Time Based Conditions

The following conditions are the time-based conditions used by the Time Based Services:

- `cp:validity` (Refer to [RFC 4745](#))
- `mmt-serv:invalidity`
- `mmt-serv:valid-periods`

The Time Based Services in MTAS are using an ordered set of service rules. The XML Schema of a Time Base Service reuses the rule syntax. For more information, refer to [MTAS Ut Structure](#). The rules take the following form:

```
<rule id="ruleid">
  <cp:conditions>
    Time based condition
  </conditions>
  <actions>
    Service specific action
  </actions>
</rule>
```

Example 8 Time Based Services

The using details and allocation of the rule in the service data (for example in the user part, in the operator part or in both), description of other conditions and the service-specific actions are described in each service UG.

9.2 Cp:Validity

The `cp:validity` condition specifies one or more periods. The condition evaluates to true when the current time is within the validity period expressed by one of the time periods included in this condition. In all other cases, the condition evaluates to false.

It expresses the rule validity period by two attributes, a starting and an ending time. The validity condition is TRUE if the current time is greater than or equal to at least one `<from>` child, and less than the `<until>` child after it.

The format is XML dateTime. Its canonical representation is UTC and time zones are expressed as a positive or negative duration. (2005-12-24 12.00 in Stockholm,

UTC+1, is expressed as 2005-12-24T12:00:00+01:00 and has the corresponding canonical representation 2005-12-24T11:00:00Z.)

When the validity period is given in local time format, the UTC offset is taken from the <user-common-data>. If the UTC offset is not provisioned for the user, the value from the CM attribute `mtasMmtCalUtcOffset` is used.

Times in `cp:validity` conditions are converted to UTC before being compared to the current time, also in UTC.

An example of the validity condition, with all the three formats are shown in Example 9

```
<cp:conditions>
  <cp:validity>
    <!-- This example shows time being defined as an offset from UTC-->
    <cp:from>2010-10-12T20:00:00-08:00</cp:from>
    <cp:until>2010-10-19T19:59:59-08:00</cp:until>

    <!-- Example of time given in UTC as shown by the Z -->
    <cp:from>2010-11-27T20:00:00Z</cp:from>
    <cp:until>2010-11-28T08:00:00Z</cp:until>

    <!-- Example of using local time -->
    <cp:from>2010-12-24T16:00:00</cp:from>
    <cp:until>2010-12-26T23:59:59</cp:until>
  </cp:validity>
</cp:conditions>
```

Example 9 Validity Conditions

9.3 Mmt-Serv:Invalidity

The `mmt-serv:invalidity` condition specifies one or more periods. The condition evaluates to false when the current time is within the validity period expressed by one of the time periods included in this condition. In all other cases, the condition evaluates to true.

It expresses the rule invalidity period by two attributes, a starting and an ending time. The invalidity condition is FALSE if the current time is greater than or equal to at least one <from> child, and less than the <until> child after it. The invalidity condition is TRUE only when the current time is not within any of the invalidity periods.

The format is XML `dateTime`. Its canonical representation is UTC and time zones are expressed as a positive or negative duration. (2005-12-24T12.00 in Stockholm, UTC+1, is expressed as 2005-12-24T12:00:00+01:00 and has the corresponding canonical representation 2005-12-24T11:00:00Z.)



When the invalidity period is given in local time format, the UTC offset is taken from the `<user-common-data>`. If the UTC offset is not provisioned for the user, the value from the CM attribute `mtasMmtCalUtcOffset` is used.

Times in `mmt-serv:invalidity` conditions are converted to UTC before being compared to the current time, also in UTC.

An example of the invalidity condition, with all the three formats are shown in Example 10

```
<cp:conditions>
  <mmt-serv:invalidity>
    <!-- This example shows time being defined as an offset from UTC-->
    <mmt-serv:from>2010-10-12T20:00:00-08:00</mmt-serv:from>
    <mmt-serv:until>2010-10-19T19:59:59-08:00</mmt-serv:until>

    <!-- Example of time given in UTC as shown by the Z -->
    <mmt-serv:from>2010-11-27T20:00:00Z</mmt-serv:from>
    <mmt-serv:until>2010-11-28T08:00:00Z</mmt-serv:until>

    <!-- Example of using local time -->
    <mmt-serv:from>2010-12-24T16:00:00</mmt-serv:from>
    <mmt-serv:until>2010-12-26T23:59:59</mmt-serv:until>
  </mmt-serv:invalidity>
</cp:conditions>
```

Example 10 Invalidation Condition

9.4 Mmt-serv:Valid-Periods

The `mmt-serv:valid-periods` condition allows assembly of complex time condition based on of the following elements, attributes, and subconditions:

- `mmt-serv:utc-offset` element
- `mmt-serv:valid-days` subcondition
- `mmt-serv:valid-times` subcondition
- `mmt-serv:valid-months` subcondition
- `mmt-serv:valid-weeks` subcondition
- `mmt-serv:repeat-daily` subcondition
- `mmt-serv:repeat-weekly` subcondition
- `mmt-serv:repeat-monthly` subcondition
- `mmt-serv:monthdays` subcondition



— `except-holidays` attribute

If any of the elements within the subconditions evaluate to TRUE, then the subcondition evaluates to TRUE.

The `mmt-serv:valid-periods` evaluates to TRUE only when all the included subconditions evaluates to TRUE.

It is also possible to mark the holidays as exception for the whole `mmt-serv:valid-periods` condition. So, when the current day is holiday then the `mmt-serv:valid-periods` evaluates to FALSE.

Each subcondition can occur only once (0-1 times) in the `valid-periods` condition.

Each subcondition is evaluated independently of the others, so for example the `valid-monthdays` is evaluated independently of the `valid-months`. Only match with the current date and time is checked for each subcondition, not bothering with the sanity of the combination of the subconditions.

9.4.1 Mmt-Serv:Utc-Offset

The `mmt-serv:utc-offset` element is used to specify the time zone offset. The value of the offset can be + or - regarding UTC, for example, [+], The value of an hour is 00-23, for example, [0-1][0-9]2[0-3]. For minutes, the value is 00-59, for example, [0-5][0-9].

If `mmt-serv:utc-offset` element is omitted, the `mmt-serv:valid-periods` condition uses the UTC Offset either from the User Common Data or from the CM attribute `mtasMmtCalUtcOffset`, see Section 5 on page 9.

An example of a time zone offset is shown in Example 1.

```
<mmt-serv:utc-offset>+06:30</mmt-serv:utc-offset>
```

Example 11 UTC-Offset

9.4.2 Mmt-Serv:Valid-Days

The `mmt-serv:valid-days` subcondition is used to define days of the week on which the `mmt-serv:valid-periods` condition is evaluated to TRUE. One day or multiple days can be defined.

An example of a valid-days subcondition is shown in Example 12.



```
<mmt-serv:valid-days>
  <mmt-serv:day>Monday</mmt-serv:day>
  <mmt-serv:day>Tuesday</mmt-serv:day>
  <mmt-serv:day>Wednesday</mmt-serv:day>
  <mmt-serv:day>Thursday</mmt-serv:day>
  <mmt-serv:day>Friday</mmt-serv:day>
</mmt-serv:valid-days>
```

Example 12 Valid Days

It is also possible to use the Workday and NonWorkday shorthand (see Section 7 on page 13) in the `mmt-serv:valid-days` subcondition, as shown in Example 13

```
<mmt-serv:valid-days>
  <mmt-serv:day>Workday</mmt-serv:day>
</mmt-serv:valid-days>
```

Example 13 Valid Days Subcondition

The special use of the `mmt-serv:valid-days` when Holiday literal is used. This option indicates that condition is to be evaluated to TRUE on the days configured on the Holiday List (see Section 8 on page 15).

9.4.3 Mmt-Serv:Valid-Times

The `mmt-serv:valid-times` subcondition is used to define the intervals of the day within the condition is evaluated to TRUE. If `mmt-serv:valid-times` is omitted, the `mmt-serv:valid-periods` condition applies to all times of day, that is, 00:00-24:00. An example of a valid-times subcondition is shown in Example 14.

```
<mmt-serv:valid-times>
  <mmt-serv:interval from="09:00" until="12:00"/>
  <mmt-serv:interval from="13:00" until="17:00"/>
</mmt-serv:valid-times>
```

Example 14 Valid Times

9.4.4 Mmt-Serv:Valid-Months

The `mmt-serv:valid-months` subcondition is used to define the calendar months within the condition is evaluated to TRUE. One month or multiple months can be defined.

If `mmt-serv:valid-months` is omitted, the `mmt-serv:valid-periods` condition applies to all months of the year.

An example of a valid-months subcondition is shown in Example 15. The subcondition is evaluated to TRUE in the first two months of the year.



```
<mmt-serv:valid-months>
  <mmt-serv:month>1</mmt-serv:month>
  <mmt-serv:month>2</mmt-serv:month>
</mmt-serv:valid-months>
```

Example 15 Valid Months

9.4.5 Mmt-Serv:Valid-Weeks

The `mmt-serv:valid-weeks` subcondition is used to define the calendar weeks within the condition is evaluated to TRUE. One week or multiple weeks can be defined.

If `mmt-serv:valid-weeks` is omitted, the `mmt-serv:valid-periods` condition applies to all weeks of the year.

The week numbering scheme is determined by the selected Start Day of the Week, see Section 6 on page 11.

An example of a valid-weeks subcondition is shown in Example 16. The subcondition is evaluated to TRUE in the first two calendar weeks.

```
<mmt-serv:valid-weeks>
  <mmt-serv:week>1</mmt-serv:week>
  <mmt-serv:week>2</mmt-serv:week>
</mmt-serv:valid-weeks>
```

Example 16 Valid Weeks

9.4.6 Mmt-Serv:Repeat-Daily

The `mmt-serv:repeat-daily` subcondition is used to define specifies start day and repetition interval for the days on which the condition is evaluated to TRUE.

If `mmt-serv:repeat-daily` is omitted, the `mmt-serv:valid-periods` condition applies to all days of the year.

An example of a repeat-daily subcondition is shown in Example 17. The subcondition is evaluated to TRUE every second day starting with 2010-09-06.

```
<mmt-serv:repeat-daily>
  <mmt-serv:begin-day>2010-09-06</mmt-serv:begin-day>
  <mmt-serv:repeat-interval>2</mmt-serv:repeat-interval>
</mmt-serv:repeat-daily>
```

Example 17 Repeat Daily



9.4.7 Mmt-Serv:Repeat-Weekly

The `mmt-serv:repeat-weekly` subcondition is used to define specifies start day and repetition interval for the weeks on which the condition is evaluated to TRUE.

If `mmt-serv:repeat-weekly` is omitted, the `mmt-serv:valid-periods` condition applies to all weeks of the year.

The counting of the weekly repetition is determined by the selected Start Day of the Week.

An example of a repeat-weekly subcondition is shown in Example 18. The subcondition is evaluated to TRUE every second week starting with the week of 2010-09-06, but not before 2010-09-06.

```
<mmt-serv:repeat-weekly>
  <mmt-serv:begin-day>2010-09-06</mmt-serv:begin-day>
  <mmt-serv:repeat-interval>2</mmt-serv:repeat-interval>
</mmt-serv:repeat-weekly>
```

Example 18 Repeat Weekly

9.4.8 Mmt-Serv:Repeat-Monthly

The `mmt-serv:repeat-monthly` subcondition is used to define specifies start day and repetition interval for the months on which the condition is evaluated to TRUE.

If `mmt-serv:repeat-monthly` is omitted, the `mmt-serv:valid-periods` condition applies to all months of the year.

An example of a repeat-monthly subcondition is shown in Example 19. The subcondition is evaluated to TRUE every second month starting with the week of 2010-09-06, but not before 2010-09-06.

```
<mmt-serv:repeat-monthly>
  <mmt-serv:begin-day>2010-09-06</mmt-serv:begin-day>
  <mmt-serv:repeat-interval>2</mmt-serv:repeat-interval>
</mmt-serv:repeat-monthly>
```

Example 19 Repeat Monthly

9.4.9 Mmt-Serv:Monthdays

The `mmt-serv:valid-monthdays` subcondition is used to define days of the month on which the `mmt-serv:valid-periods` condition is evaluated to TRUE. One day or multiple days can be defined.



If `mmt-serv:valid-monthdays` is omitted, the `mmt-serv:valid-periods` condition applies to all days of the month. In the `mmt-serv:valid-monthdays` subcondition there is several way to specify the day of the months.

The first way is by the usual day of the month.

An example of a `valid-monthdays` subconditions specifying 1st and 2nd days of the month is shown in Example 20.

```
<mmt-serv:valid-monthdays>
  <mmt-serv:monthday>1</mmt-serv:monthday>
  <mmt-serv:monthday>2</mmt-serv:monthday>
</mmt-serv:valid-monthdays>
```

Example 20 Valid Monthdays

The second way is by counting the days backward. An example of a `valid-monthdays` subconditions specifying the last two days of the month is shown in Example 21.

```
<mmt-serv:valid-monthdays>
  <mmt-serv:monthday>-1</mmt-serv:monthday>
  <mmt-serv:monthday>-2</mmt-serv:monthday>
</mmt-serv:valid-monthday>
```

Example 21 Valid Monthdays Subcondition

The third way is by referring to specific weekdays within the month. An example of a `valid-monthdays` subconditions specifying the first Monday and the second Wednesday of the month is shown in Example 22.

```
<mmt-serv:valid-monthdays>
  <mmt-serv:monthday>1Monday</mmt-serv:monthday>
  <mmt-serv:monthday>2Wednesday</mmt-serv:monthday>
</mmt-serv:valid-monthdays>
```

Example 22 Valid Month Subcondition

The fourth way is similar to the third but by identifying the weekdays counting backward. An example of a `valid-monthdays` subconditions specifying the last Sunday of the month is shown in Example 23.

```
<mmt-serv:valid-monthdays>
  <mmt-serv:monthday>-1Sunday</mmt-serv:monthday>
</mmt-serv:valid-monthdays>
```

Example 23 Valid Month Subcondition



9.4.10 Except-Holidays

The `except-holidays` attribute of the `mmt-serv:valid-periods` condition is applicable to the whole condition. It means that whatever is specified by the subconditions the Holidays (see Section 8 on page 15) are exceptions, and the `mmt-serv:valid-periods` condition is evaluated to FALSE.

An example of a `valid-periods` condition with the `except-holidays` attribute is shown in Example 24. The condition is always evaluated to TRUE except the Holidays.

```
<mmt-serv:valid-periods except-holidays="true">  
</mmt-serv:valid-periods>
```

Example 24 Except Holidays





10 Complex Condition Examples

A condition that is evaluated to TRUE on 5 days of the week, in the first two months of the year, during two given intervals of the day, is shown in Example 25.

```
<cp:conditions>
  <mmt-serv:valid-periods>
    <mmt-serv:valid-days>
      <mmt-serv:day>Monday</mmt-serv:day>
      <mmt-serv:day>Tuesday</mmt-serv:day>
      <mmt-serv:day>Wednesday</mmt-serv:day>
      <mmt-serv:day>Thursday</mmt-serv:day>
      <mmt-serv:day>Friday</mmt-serv:day>
    </mmt-serv:valid-days>
    <mmt-serv:valid-months>
      <mmt-serv:month>1</mmt-serv:month>
      <mmt-serv:month>2</mmt-serv:month>
    </mmt-serv:valid-months>
    <mmt-serv:valid-times>
      <mmt-serv:interval from="09:00" until="12:00"/>
      <mmt-serv:interval from="13:00" until="17:00"/>
    </mmt-serv:valid-times>
  </mmt-serv:valid-periods>
</cp:conditions>
```

Example 25 True 5 Days

A condition that is evaluated to TRUE every second day starting from the given start day, during two given intervals of the day is shown in Example 26.

```
<cp:conditions>
  <mmt-serv:valid-periods>
    <mmt-serv:valid-daily>
      <mmt-serv:begin-day>2010-09-06</mmt-serv:begin>
      <mmt-serv:repeat-interval>2</mmt-serv:interval>
    </mmt-serv:valid-daily>
    <mmt-serv:valid-times>
      <mmt-serv:interval from="09:00" until="12:00"/>
      <mmt-serv:interval from="13:00" until="17:00"/>
    </mmt-serv:valid-times>
  </mmt-serv:valid-periods>
</cp:conditions>
```

Example 26 True Every Second Day

A condition that is evaluated to TRUE on three weekdays, every second week starting from the given start day, during two given intervals of the day is shown in Example 27.



```

<cp:conditions>
  <mmt-serv:valid-periods>
    <mmt-serv:repeat-weekly>
      <mmt-serv:begin-day>2010-09-06</mmt-serv:begin-day>
      <mmt-serv:repeat-interval>2</mmt-serv:repeat-interval>
    </mmt-serv:repeat-weekly>
    <mmt-serv:valid-days>
      <mmt-serv:day>Monday</mmt-serv:day>
      <mmt-serv:day>Tuesday</mmt-serv:day>
      <mmt-serv:day>Wednesday</mmt-serv:day>
    </mmt-serv:valid-days>
    <mmt-serv:valid-times>
      <mmt-serv:interval from="09:00" until="12:00"/>
      <mmt-serv:interval from="13:00" until="17:00"/>
    </mmt-serv:valid-times>
  </mmt-serv:valid-periods>
</cp:conditions>

```

Example 27 True on Three Weekdays

A condition that is evaluated to TRUE every second month starting from the given start day, on the first, on the 13th, and the third Sunday, during two given intervals of the day, is shown in Example 28.

```

<cp:conditions>
  <mmt-serv:valid-periods>
    <mmt-serv:repeat-monthly>
      <mmt-serv:begin-day>2010-09-06</mmt-serv:begin-day>
      <mmt-serv:repeat-interval>2</mmt-serv:repeat-interval>
    </mmt-serv:repeat-monthly>
    <mmt-serv:valid-monthdays>
      <mmt-serv:monthday>1</mmt-serv:monthday>
      <mmt-serv:monthday>13</mmt-serv:monthday>
      <mmt-serv:monthday>3Sunday</mmt-serv:monthday>
    </mmt-serv:valid-monthdays>
    <mmt-serv:valid-times>
      <mmt-serv:interval from="09:00" until="12:00"/>
      <mmt-serv:interval from="13:00" until="17:00"/>
    </mmt-serv:valid-times>
  </mmt-serv:valid-periods>
</cp:conditions>

```

Example 28 True Every Second Month

A condition that is evaluated to TRUE on non-workdays, every second week starting from the given start day, during two given intervals of the day, except three days in 2010-11 is shown in Example 29.



```
<cp:conditions>
  <mmt-serv:valid-periods>
    <mmt-serv:repeat-weekly>
      <mmt-serv:begin-day>2010-09-06</mmt-serv:begin-day>
      <mmt-serv:repeat-interval>2</mmt-serv:repeat-interval>
    </mmt-serv:repeat-weekly>
    <mmt-serv:valid-days>
      <mmt-serv:day>NonWorkday</mmt-serv:day>
    </mmt-serv:valid-days>
    <mmt-serv:valid-times>
      <mmt-serv:interval from="09:00" until="12:00"/>
      <mmt-serv:interval from="13:00" until="17:00"/>
    </mmt-serv:valid-times>
  </mmt-serv:valid-periods>
  <mmt-serv:invalidity>
    <mmt-serv:from>2010-11-15T00:00:00</mmt-serv:from>
    <mmt-serv:until>2010-11-17T23:59:59</mmt-serv:until>
  </mmt-serv:invalidity>
</cp:conditions>
```

Example 29 True on Non-Workdays

A condition that is evaluated to TRUE on workdays in 2011 and 2012, during two given intervals of the day, except the Holidays is shown in Example 30.

```
<cp:conditions>
<cp:validity>
  <cp:from>2011-01-01T00:00:00</cp:from>
  <cp:until>2012-12-31T23:59:59</cp:until>
</cp:validity>
<mmt-serv:valid-periods except-holidays="true">
  <mmt-serv:valid-days>
    <mmt-serv:day>Workday</mmt-serv:day>
  </mmt-serv:valid-days>
  <mmt-serv:valid-times>
    <mmt-serv:interval from="09:00" until="12:00"/>
    <mmt-serv:interval from="13:00" until="17:00"/>
  </mmt-serv:valid-times>
</mmt-serv:valid-periods>
</cp:conditions>
```

Example 30 True on Workdays