

TimeML Annotation Guidelines

Version: 1.0

Internal Version: 0.4.0

Release Date: 21-07-02

Authors James Pustejovsky, Roser Saurí, Andrea Setzer, Rob Gaizauskas, Bob Ingria.

TERQAS Annotation Working Group Members: Lisa Ferro, Marcia Lazo, David Day, Patrick Hanks, Marc Verhagen, Andrea Setzer, Andrew See, Roser Saurí, José Castaño, Bob Ingria, Rob Gaizauskas, Graham Katz, James Pustejovsky.

Contents

1	Introduction	1
2	Explanation of TimeML Tags and their Attributes	2
2.1	The tag <code><EVENT></code>	2
2.1.1	How to annotate EVENTS	2
2.1.2	Attributes for EVENT	6
2.1.3	BNF for the EVENT tag	10
2.1.4	Complete annotation of EVENTS in some of the previous examples	11
2.2	The tag <code><TIMEX3></code>	14
2.2.1	How to annotate TIMEX3s	14
2.2.2	Attributes for TIMEX3	18
2.2.3	BNF for the TIMEX3 tag	24
2.3	The tag <code><SIGNAL></code>	24
2.3.1	How to annotate SIGNALs	25
2.3.2	Attributes for SIGNAL	25
2.3.3	BNF for the SIGNAL tag	25
2.4	The tag <code><MAKEINSTANCE></code>	26
2.4.1	How to annotate MAKEINSTANCES	26
2.4.2	Attributes for MAKEINSTANCE	27
2.4.3	BNF for the MAKEINSTANCE tag	27
2.5	The link tags: <code><TLINK></code> , <code><SLINK></code> , and <code><ALINK></code>	27
2.5.1	How to annotate LINKs	30
2.5.2	Attributes for LINKs	34
2.5.3	BNF for the link tags	35
3	Completely annotated examples	37
3.1	Complex TIMEX Examples	37
3.2	Complex TLINK and SLINK Examples	40
3.3	Causative Examples	45

Chapter 1

Introduction

This document describes the annotation guidelines for marking up text according to the TimeML language. It presents the results to date of discussions and trial annotations of the TERQAS annotation working group.

The document is organised as follows. The next chapter explains what the TimeML tags (XML elements) are and how to annotate them. It also specifies for each tag what its attributes are and provides a BNF definition for the tag and its attributes. While this exposition contains many examples illustrating what and how to tag, the examples focus, for clarity's sake, on the tag under discussion at any given point. A third and final chapter, therefore, provides a set of fully annotated examples, illustrating all of the interactions between the various entity and relational tags.

For the sake of convenience, I&P(02) will be used to refer to Ingria and Pustejovsky [2002] and TIDES(02), to Ferro et al. [2002] throughout the whole document.

Chapter 2

Explanation of TimeML Tags and their Attributes

2.1 The tag <EVENT>

We consider “events” a cover term for situations that *happen* or *occur*. Events can be punctual (1-2) or last for a period of time (3-4). We also consider as events those predicates describing *states* or *circumstances* in which something obtains or holds true (5). Not all stative predicates will be marked up, however. See subsection 2.1.2, on events belonging to the class 'STATE'.

1. *Ferdinand Magellan, a Portuguese explorer, first **reached** the islands in search of spices.*
2. *A fresh flow of lava, gas and debris **erupted** there Saturday.*
3. *11,024 people, including local Aeta aborigines, **were evacuated** to 18 disaster relief centers.*
4. *“We’re **expecting** a major eruption,” he said in a telephone interview early today.*
5. *Israel has been scrambling to buy more masks abroad, after a **shortage** of several hundred thousand gas masks.*

2.1.1 How to annotate EVENTS

Events may be expressed by means of tensed or untensed verbs (1 and 2), nominalizations (3), adjectives (4), predicative clauses (5), or prepositional phrases (6):

1. *A fresh flow of lava, gas and debris **erupted** there Saturday.*
2. *Prime Minister Benjamin Netanyahu called the prime minister of the Netherlands **to thank** him for thousands of gas masks his country has already contributed.*
3. *Israel will ask the United States to delay a military **strike** against Iraq until the Jewish state is fully prepared for a possible Iraqi **attack**.*
4. *A Philippine volcano, **dormant** for six centuries, began exploding with searing gases, thick ash and deadly debris.*
5. *“There is no reason why we would not **be prepared**,” Mordechai told the Yediot Ahronot daily.*

6. *All 75 people **on board** the Aeroflot Airbus died.*

Note that in the above sentences not all “markables” are tagged. In the first example, for instance, neither *flow* nor *Saturday* is marked.

The annotation of formally simple events (examples 1, 3, 4 and 6 above) is straightforward. Assume for now that events have only an id attribute:

```
A fresh flow of lava, gas and debris
<EVENT eid="e1">
erupted
</EVENT>
there Saturday.
```

However, formally complex events may be sequentially discontinuous in some contexts:

1. *There is no reason why we would not **be prepared**.*
*There is no reason why we would not **be fully prepared**.*
2. *They will definitely **take into consideration** our readiness.*
*They will definitely **take it into consideration**.*

In order to avoid problems derived from tagging discontinuous sequences, employ the following strategies:

- If the event is expressed by a verbal phrase (*has been scrambling, to buy, were reported*), the EVENT tag will be applied only to its head, which is marked in bold face in the following examples:

Israel has been scrambling to buy more masks abroad.
No injuries were reported.
The private sector could establish a private agency.
If we had been attacked , ...

If the main verb falls within the scope of a modal auxiliary, as in the third example above, or a negative particle as in

Kaufman did not disclose details of the deal.

then the EVENT tag is only applied to the main verb, but the modal and/or negation is tagged as a signal indicating a subordinated context – see sections 2.3 and 2.5.

- If the main predicate is a phrasal verb, only the verbal part (and not its particle) will be marked:

Additional distribution centers would be set up next week.

- If the event is expressed by a verbal cluster which consists of an aspectual verb and a main verb, both verbs will be tagged as independent events. Examples of aspectual verbs are: *begin, stop, end, keep*, etc. See subsection 2.1.2.
- If the aspectual verb is preceded by auxiliary forms (as in the last two examples below), the first criterion above will be applied as well. In the following examples, the underlining delimits the verbal cluster, whereas square brackets signal the scope of each EVENT tag:

The private sector [began] [establishing] a private agency.

If US had [stopped] [interfering] in other countries policies long ago, ...

They probably would have[began] [responding] to President Reagan's 600 ships plan with new construction.

- If the event is a nominalization which appears as the head of the NP along with other elements (specifiers, complements, modifiers), only the head element will be marked:

The young industry's rapid growth also is attracting regulators eager to police its many facets.

- If the event is a nominalization accompanied by some sort of light predicate (as shown by the underlined segments below), we will tag both elements.

Several pro-Iraq demonstrations have taken place in the last week.

They will definitely take into consideration our readiness.

Both elements are tagged because both verbal and nominal heads are relevant to different kind of event information. The two tagged events will be related as IDENTICAL by the `relType` attribute in the TLINK tag (see section 2.5).

- If the event is a predicative clause, only the predicative element (the adjective or the nominal in the following examples) will be tagged. This is done by applying the test of headedness in order to decide what to mark:

1. If the predicative element is ENDOCENTRIC (i.e. if it has a head), then we will tag the head only. In the following examples, the predicative element is delimited by square brackets, whereas its head is marked in bold face:

There is no reason why we would not be [fully prepared].

If, in spite of everything, we will not be [ready], we will ask the United States to delay the operation.

James Pustejovsky was [CTO of LingoMotors] for several years.

2. If the predicative element is EXOCENTRIC (i.e. if it has no single head), then we will mark up the entire expression within the TimeML tag.

All 75 people were on board at 9:00 a.m.

- If the event is expressed by means of a prepositional phrase (PP), we will also use the strategy based on the headedness of the prepositional phrase. Therefore, the following example, where the PP is exocentric, will be tagged as shown:

All 75 people on board the Aeroflot Airbus died.

- Causative predicates raise issues as to whether the event signaled by the causative is genuinely distinct from the event which may be the causative's logical subject. For example, in

The rains caused the flooding.

is the *cause* event distinct from the *rains* event, and should they be tagged as such?

Three cases can be distinguished:

Case 1 EVENT cause EVENT

The [rains] [caused] the [flooding].

Case 2 ENTITY cause EVENT

John [caused] the [fire].

Case 3 EVENT. Discourse marker EVENT

He [kicked] the ball, and it [rose] into the air.

For now, we adopt the following solution for causative predicates in TimeML.

1. If the annotator encounters a predicate denoting a causative relation between arguments in a sentence, then, either:
 - (a) If the (logical) subject is an event denoting expression (e.g., *war, flood, rain, meeting*, etc.), then mark it as an event, or: (CASE 1 ABOVE)
 - (b) If the (logical) subject is an individual entity (e.g., *John, the woman, the company*, etc.), then do nothing with it. (CASE 2 ABOVE)
2. Mark the object event as an event (*flooding, fire*).
3. Mark the predicate denoting the causative relation as an event (*caused*).
4. If there is an event introduced by the subject, as in Case 1, then introduce a TLINK with a `relType` attribute of `IDENTITY` identifying the causative relation event with the subject event (see section 2.5 for a discussion of the TLINK tag and its attributes).
5. Introduce a TLINK between the causative predicate event and the event associated with the object position, with `relType` of `BEFORE`.

This solution should be adopted for verbs such as the following, in their causative senses: *cause, stem from, lead to, breed, engender, hatch, induce, occasion, produce, bring about, produce, secure*.

For CASE 3 above, the annotator has the option of identifying the discourse marker *and* as a signal (see section 2.3) for a TLINK introducing `relType` `BEFORE`, or not. The annotator CAN identify the TLINK between the events, but NEED NOT.

Fully annotated versions of the above examples are presented in Chapter 3.3.

What NOT to tag

- Generics will not be tagged, at least for now, even though capturing them could be of use in question answering.

For example, the event words in the following sentences will not be tagged:

Use of corporate jets for political travel is legal.

Businesses are emerging on the Internet so quickly that no one, including government regulators, can keep track of them.

Jews are prohibited from killing one another.

Here a property is ascribed to each of a class of events, or a relation is asserted between a class of events and members of a set of entities, but no single event instance, or set of event instances, in this class is positioned in time, or in relation to other temporally located events.

Standing between examples such as the preceding pure generics and others which express a single event, clearly positioned in time, and hence clearly taggable, such as

On June 7, Mr. Sununu used a jet provided by Fiber Materials Inc.

are less clear cut cases such as

Mr. Sununu has resorted to regular use of corporate planes for political travel.

Such sentences express typical patterns of activity, but do not explicitly refer to specific events. For now such examples will **not** be tagged.

- Subordinating verbs which express events which are clearly temporally located, but whose complements are generics should themselves not be tagged. For example, a tensed reporting verb which attributes a generic should not be tagged:

The rabbi said Jews are prohibited from killing one another.

In this case as the subordinated proposition is not tagged, the matrix verb *said* will also not be tagged.

- An event nominalisation that provides no information beyond that supplied by the verb to which it is bound need not be tagged. For example:

Newspaper reports have said ...

In this context *said* is tagged as an event, and *reports* is not tagged.

2.1.2 Attributes for EVENT

a. Event ID number (eid) Non-optional attribute. Each event has to be identified by a unique ID number. This will be automatically assigned by the annotation tool every time an EVENT tag is assigned to some string.

b. Class Non-optional attribute. Each event belongs to one of the following classes. Note that while the examples show verbs expressing an event of a given type, it does not follow that every occurrence of the verb in question necessarily expresses an event of the same type. I.e. verbs may be ambiguous with respect to event class.

- REPORTING:

Reporting events describe the action of a person or an organization declaring something, narrating an event, informing about an event, etc. Some examples: *say, report, tell, explain, state*:

Punongbayan said that the 4,795-foot-high volcano was spewing gases up to 1,800 degrees.

No injuries were reported over the weekend.

Citing an example, ...

- PERCEPTION:

This class includes events involving the physical perception of another event. Such events are typically expressed by verbs like: *see, watch, glimpse, behold, view, hear, listen, overhear*.

*Witnesses tell Birmingham police they **saw** a man running.*

*"You can **hear** the thousands of small explosions down there", a witness said.*

- ASPECTUAL:

In languages such as English and French, there is a grammatical device of aspectual predication, which focuses on different facets of event history:

1. Initiation: *begin, start, commence, set out, set about, lead off, originate, initiate.*
2. Reinitiation: *restart, reinitiate, reignite* (metaphorically)
3. Termination: *stop, cancel* (see also LACTION class), *end, halt, terminate, cease, discontinue, interrupt, quit, give up, abandon, block, break off, lay off, call off, wind up.*
4. Culmination: *finish, complete.*
5. Continuation: *continue, keep, go on, proceed, go along, carry on, uphold, bear on, persist, persevere.*

A couple of examples:

*The volcano **began** showing signs of activity in April for the first time in 600 years,...*

*All non-essential personnel should **begin** evacuating the sprawling base.*

Here, a member of a closed class of predicates is able to select a verbal or nominal complement as an argument and mark that event with the function (designation) associated with one of the facets above. See section 2.5 for the annotation of the relation between the two events.

- LACTION:

An LACTION is an Intensional Action. An LACTION **introduces an event argument** describing an action or situation **from which we can infer something given its relation with the LACTION**. For instance, the events introduced as arguments of the LATIONS in (1) have not necessarily occurred when the LACTION takes place. Explicit performative predicates (like those in 5-9, below) are also included here. Note that the LACTION class does not cover states (see the description of LSTATES below).

The following list, where LACTIONs are in bold face and the events they introduce are underlined, is representative (not exhaustive) of the types of events included in this class:

1. **attempt, try, scramble:**

*Companies such as Microsoft or a combined worldcom MCI are **trying** to monopolize Internet access.*

*Israel has been **scrambling** to buy more masks abroad.*

2. **investigate, investigation, look at, delve:**

*The Organization of African Unity will **investigate** the Hutu-organized genocide of more than 500,000 minority Tutsis.*

*A new Essex County task force began **delving** Thursday into the slayings of 14 black women.*

3. **delay, postpone, defer, hinder, set back:**

*Israel will ask the United States to **delay** a military strike against Iraq.*

4. **avoid, prevent, cancel:**

*Palestinian police **prevented** a planned pro-Iraq rally by the Palestinian Professionals' Union.*

5. **ask, order, persuade, request, beg, command, urge, authorize:**

*Iraqi military authorities **ordered** all Americans and Britons in Kuwait to assemble at a hotel.*

*They were **asked** to take along important papers.*

6. **promise, offer, assure, propose, agree, decide:**

*Germany has **agreed** to lend Israel 180,000 protective kits against chemical and biological weapons, and Switzerland **offered** to lend Israel another 25,000 masks.*

7. **swear, vow.**

8. **name, nominate, appoint, declare, proclaim.**

9. **claim, allege, suggest.**

• **LSTATE:**

LSTATE events are similar to the previous class. This class includes **states that refer to alternative or possible worlds**, (delimited by square brackets in the examples below), which can be introduced by subordinated clauses (1-2), nominalizations (3), or untensed VPs (4):

1. *Russia now **feels** [the US must hold off at least until UN secretary general Kofi Annan visits Baghdad].*
2. *Once they get that extinguished, they **hope** that [residents will begin returning to their homes].*
3. *"There is no reason why we would not be **prepared** for [an attack"].*
4. *The agencies fear they will be **unable** [to crack those codes to eavesdrop on spies and crooks].*

As above, the following list of LSTATEs is just representative, not exhaustive:

1. **believe, think, suspect, imagine, doubt, feel, be conceivable, be sure:**

*"We **believe** that [his words cannot distract the world from the facts of Iraqi aggression]."*

*Analysts also **suspect** [suppliers have fallen victim to their own success].*

*Russia now **feels** [the US must hold off at least until UN secretary general Kofi Annan visits Baghdad].*

*It is **conceivable** that [a larger eruption will take place in few hours].*

*He said he was **sure** that [a larger eruption would happen].*

2. **want, love, like, desire, crave, lust:**

*"They don't **want** [to play with us]," one U.S. crew chief said.*

*We aim at triggering associations that will generate **lust** for [change].*

*An occupation Israel would **love** [to end], but ...*

Note that *love* as in *John loves Paul's cousin* is NOT considered an LSTATE. Similarly for *like*. An LSTATE must govern another event.

3. **hope, expect, aspire, plan:**

*"We're **expecting** [a major eruption]," he said in a telephone interview early today.*

*Once they get that extinguished, they **hope** that [residents will begin returning to their homes].*

*We **aim** at [triggering associations that will generate lust for change].*

4. **fear, hate, dread, worry, be afraid:**

*The agencies **fear** [they will be unable to crack those codes to eavesdrop on spies and crooks].*

*They were **afraid** [to stay].*

5. **need, require, demand**

6. **be ready, be eager, be prepared**

*The young industry's rapid growth also is attracting regulators **eager** [to police its many facets].*

*"There is no reason why we would not be **prepared** for [an attack]".*

7. **be able, be unable**

*The agencies fear they will be **unable** [to crack those codes to eavesdrop on spies and crooks].*

All LSTATEs will be annotated, whether they are persistent or not throughout the text being marked-up (see next class).

• STATE:

States describe *circumstances* in which something obtains or holds true. However, we will only annotate:

1. States that are identifiably changed over the course of the document being marked up. For instance, in the first example below, in the expression *the Aeroflot Airbus* the relationship indicating that the Airbus is run and operated by Aeroflot is not a STATE in the desired sense. Rather, because it is persistent throughout the event line of the document, we factor it out and it is not marked up. On the other hand, properties that are known to change during the events represented/reported in an article will be marked as STATES.

In these and the following examples the markable state is in bold face.

*All 75 people **on board** the Aeroflot Airbus died.*

*Israel has been scrambling to buy more masks abroad, after a **shortage** of several hundred thousand gas masks, including those for young children, was discovered.*

*No **injuries** were reported over the weekend.*

2. States that are directly related to a temporal expression.

This criterion includes all states that are linked to a TIMEX3 markable by means of a TLINK. Two examples are given here, where the state is in bold face and the temporal expression associated with it is underlined.

*James Pustejovsky was **CTO** for several years.
They **lived** in U.N.-run refugee camps for 2 1/2 years.*

3. States that are introduced by an LACTION, an LSTATE, or a REPORTING event. States are in bold face, the introducing event underlined.

*He mediated the **crisis**.
Saddam Hussein sought **peace** on another front.
Har-Shefi told police that Rabin was a **traitor**.*

4. Predicative states the validity of which is dependent on the document creation time

In spite of not being explicitly related to any TIMEX3 expression, the states introduced by *are* in the following examples will be tagged given that their validity is relative to the point in time they have been asserted (the DCT).

*A total of about 3,000 Americans, 3,000 Britons and more than 450 Japanese **are** in Iraq and Kuwait.
Overall, more than 2 million foreigners **are** in both countries.*

This will however apply only to predicative states. Sortal states (like *President*, *CTO*, etc.) won't be marked up.

Note that the current class, STATE, will not contain states that have been tagged as LSTATES.

- OCCURRENCE:

This class includes all the many other kinds of events describing something that happens or occurs in the world. Some examples are given as illustration:

*The Defense Ministry said 16 planes have **landed** so far with protective equipment against biological and chemical warfare.
Mordechai said all the gas masks from abroad would **arrive** soon and be **distributed** to the public, adding that additional distribution centers would be **set up** next week.
Two moderate **eruptions** shortly before 3 p.m. Sunday appeared to **signal** a larger **explosion**.*

c. **Additional attributes:** EVENT has two additional attributes: '**tense**' and '**aspect**'. They will be introduced during preprocessing, so the human annotator does not have to annotate them. The human annotator need only check for mistakes made by the preprocessor.

2.1.3 BNF for the EVENT tag

```
attributes ::= eid class tense aspect
eid ::= <integer>
class ::= 'REPORTING' | 'PERCEPTION' | 'ASPECTUAL' | 'I_ACTION' | 'I_STATE' |
         'STATE' | 'OCCURRENCE'
tense ::= 'PAST' | 'PRESENT' | 'FUTURE' | 'NONE'
aspect ::= 'PROGRESSIVE' | 'PERFECTIVE' | 'PERFECTIVE_PROGRESSIVE' | 'NONE'
```

2.1.4 Complete annotation of EVENTS in some of the previous examples

1. *The young industry's rapid growth also is attracting regulators eager to police its many facets.*

```

The young industry's rapid
<EVENT eid="e1" class="OCCURRENCE">
growth
</EVENT>
also is
<EVENT eid="e2" class="OCCURRENCE">
attracting
</EVENT>
regulators
<EVENT eid="e4" class="I_STATE">
eager
</EVENT>
to
<EVENT eid="e5" class="OCCURRENCE">
police
</EVENT>
its many facets.

```

2. *A fresh flow of lava, gas and debris erupted there Saturday.*

```

A fresh
<EVENT eid="e1" class="OCCURRENCE">
flow
</EVENT>
of lava, gas and debris
<EVENT eid="e2" class="OCCURRENCE">
erupted
</EVENT>
there Saturday.

```

3. *It is conceivable that a larger eruption will take place in few hours.*

```

It is
<EVENT eid="e1" class="I_STATE">
conceivable
</EVENT>
that a larger
<EVENT eid="e2" class="OCCURRENCE">
eruption
</EVENT>
will
<EVENT eid="e3" class="OCCURRENCE">
take
</EVENT>
place in few hours.

```

4. *Israel will ask the United States to delay a military strike against Iraq until the Jewish state is fully prepared for a possible Iraqi attack.*

```

Israel will
<EVENT eid="e1" class="I_ACTION">
ask
</EVENT>
the United States to
<EVENT eid="e2" class="I_ACTION">
delay
</EVENT>
a military
<EVENT eid="e3" class="OCCURRENCE">
strike
</EVENT>
against Iraq until the Jewish state is fully
<EVENT eid="e4" class="I_STATE">
prepared
</EVENT>
for a possible Iraqi
<EVENT eid="e5" class="OCCURRENCE">
attack
</EVENT>
.

```

5. *A Philippine volcano, dormant for six centuries, began exploding with searing gases, thick ash and deadly debris.*

```

A Philippine volcano,
<EVENT eid="e1" class="STATE">
dormant
</EVENT>
for six centuries,
<EVENT eid="e2" class="ASPECTUAL">
began
</EVENT>
<EVENT eid="e3" class="OCCURRENCE">
exploding
</EVENT>
with searing gases, thick ash and deadly debris.

```

6. *"There is no reason why we would not be prepared," Mordechai told the Yediot Ahronot daily.*

```

"There is no reason why we would not be
<EVENT eid="e1" class="STATE">
prepared
</EVENT>

```

```

," Mordechai
<EVENT eid="e2" class="REPORT">
told
</EVENT>
the Yediot Ahronot daily.

```

7. *All 75 people on board the Aeroflot Airbus died.*

```

All 75 people
<EVENT eid="e1" class="STATE">
on board
</EVENT>
the Aeroflot Airbus
<EVENT eid="e2" class="OCCURRENCE">
died
</EVENT>
.

```

8. *11,024 people, including local Aeta aborigines, were evacuated to 18 disaster relief centers set up at area schools.*

```

11,024 people, including local Aeta aborigines, were
<EVENT eid="e1" class="OCCURRENCE">
evacuated
</EVENT>
to 18 disaster relief centers
<EVENT eid="e2" class="STATE">
set
</EVENT>
up at area schools.

```

9. *The agencies fear they will be unable to crack those codes to eavesdrop on spies and crooks.*

```

The agencies
<EVENT eid="e1" class="I_STATE">
fear
</EVENT>
they will be
<EVENT eid="e2" class="I_STATE">
unable
</EVENT>
to
<EVENT eid="e3" class="OCCURRENCE">
crack
</EVENT>
those codes to
<EVENT eid="e4" class="OCCURRENCE">

```

```
eavesdrop
</EVENT>
on spies and crooks.
```

2.2 The tag <TIMEX3>

Since the details of the tag set that TimeML uses to annotate temporal expressions differ in detail both from the TIMEX tag in STAG (Sheffield Temporal Annotation Guidelines – see Setzer [2001]) and the TIMEX2 tag in TIDES, we here use the tag name TIMEX3 for temporal expressions. See I&P(02) for further details.

2.2.1 How to annotate TIMEX3s

In order to be as compliant as possible with TIDES TIMEX2 annotation, the TIMEX3 tag will be applied to TIMEX2 markable expressions. See TIDES(02), section 2, for the particular expressions we intend to cover.

However, TimeML will differ from TIDES in the following ways (the examples given below are adapted from TIDES(02)):

1. **TIMEX2 attributes that will be used:** (related to TIDES(02), sections 3.2 to 3.6)

TimeML will only take TIDES attributes **VAL** and **MOD** as appropriate for TIMEX3 elements (TIDES(02), sections 3.2 to 3.4). None of the following features will be considered: SET, PERIODICITY, GRANULARITY, NON_SPECIFIC (explained in TIDES(02), sections 3.5 and 3.6). The information that TIDES conveys by means of the first three attributes will be expressed here by MAKEINSTANCES. See section 2.4.

2. **Extent of the time expression to tag** (issue covered in TIDES(02), section 4).

The tag extent for TIMEX3 will be very similar to that proposed in TIMEX2. We follow the schema of TIDES(02), section 4, very closely in order to make the difference clear.

- (a) **Appositives:**

The treatment will be exactly as in TIDES (section 4.2.1).

- (b) **Range Expressions:**

Again, same treatment as in TIDES, section 4.2.2.

- (c) **Conjoined Expressions:**

Our treatment here will be similar to the one proposed in TIDES (section 4.2.3) in that the conjunction (or disjunction) will delimit two different TIMEX3 expressions. However, it will differ from TIDES in that the longest time expression sequences may need to be split into smaller TIMEX3 expressions.

For instance, in *Saddam might play the whole game again six months or a year from now*, the temporal expression *six months* needs to refer to (*from*) *now* in order to be correctly evaluated. Therefore, *from now* can't be considered part of the temporal expression *a year*:

Saddam might play the whole game again six months or a year from now.

```
<TIMEX3 tid="t1">
six months
```



```

</TIMEX3>
or
<TIMEX3 tid="t2">
a year
</TIMEX3>
from
<TIMEX3 tid="t3">
now
<TIMEX3>

```

(d) **Embedded Expressions:**

TIDES establishes different treatments for embedded expressions (TIDES(02), section 4.2.4). In some cases, a single tag is created. In others, there is the possibility of embedding TIMEX2 tags. This is however not necessary in TimeML, given a more general conception of temporal anchoring. The treatment of embedded expressions in TimeML is as shown below:

- i. **ONE single TIMEX3 tag** will be assigned to expressions like those in TIDES(02), section 4.2.4.1 (*When to Create One Tag*). The TimeML annotator should refer to that section for details on such expressions.

For instance, the scope for the TIMEX3 tag in the expression *twelve o'clock midnight* or *eleven in the morning* is as shown below. Assume for now that TIMEX3 only introduces an ID attribute. Complete annotations are provided in section 2.2.2.c.

```

<TIMEX3 tid="t1">
twelve o'clock midnight
</TIMEX3>

```

```

<TIMEX3 tid="t2">
eleven in the morning
</TIMEX3>

```

Some other examples are:

```

Friday evening
Tuesday the 18th
twelve o'clock January 3, 1984
the second of December
October of 1963
summer of 1964

```

- ii. **ONE single TIMEX3 tag**, with no nesting of tags inside one another, will be assigned to expressions like those referred to in section 4.2.4.2 of TIDES(02) and summarized here:

- A. Sequences of two temporal expressions that are ordered one relative to the other. They generally involve the use of temporal prepositions and conjunctions like *from*, *before*, *after*, *following*, *prior to*, etc.

*I'm leaving on vacation **two weeks from next Tuesday**.*

```

<TIMEX3 tid="t1">
two weeks from next Tuesday
</TIMEX3>

```

John left 2 days before yesterday..

```
<TIMEX3 tid="t1">
2 days before yesterday.
</TIMEX3>
```

A major earthquake struck Los Angeles three years ago today.

```
<TIMEX3 tid="t1">
three years ago today
</TIMEX3>
```

Mary arrived 4 years ago..

```
<TIMEX3 tid="t1">
4 years ago
</TIMEX3>
```

Note that the SIGNAL-markable elements *from* and *before* (see section 2.3 for an introduction to that tag) are introduced as part of the temporal expression. The annotator is strongly encouraged to check the complete annotation of the examples above in Chapter 3.

- B. Possessive constructions, if both the possessive phrase and the phrase that it modifies are temporal expressions.

This year's summer was unusually hot.

```
<TIMEX3 tid="t1">
This year's summer
</TIMEX3>
```

- iii. **TWO TIMEX3 tags related by a TLINK tag** will be applied to handle cases other than those described above. In the following examples, the scope of each TIMEX3 tag is signaled by square brackets.

I tutored an English student some [Thursdays]in [1998].
The concert is at [8:00 p.m.] on [Friday].
The concert is[Friday] at [8:00 p.m.]

The difference between temporal expressions like the one in the third example (*Friday at 8:00 p.m.*) and some others in 2(d)i above, that are handled by means of a single TIMEX3 tag (like *Friday evening*) is the presence of the signal **at** in the former case. Except for the cases introduced in 2(d)ii above, SIGNAL-markable elements will be used as delimiters of TIMEX3 tags.

- (e) **Temporal expressions containing postmodifiers**

TimeML also differs from TIDES(02) regarding the extent of temporal expressions containing **postmodifiers (prepositional phrases and dependent clauses) that introduce a related event**. So, contrary to TIDES(02), in the following examples the postmodifiers in brackets are **not** part of the temporal expression. A complete annotation of these examples, containing the links between the time expression and the event, is provided in Chapter 3.

five days after he came back

```

<TIMEX3 tid="t1">
five days
</TIMEX3>
after he
<EVENT eid="e1" class="OCCURRENCE">
came
</EVENT>
back

```

nearly four decades of experience

```

<TIMEX3 tid="t1">
nearly four decades
</TIMEX3>
of
<EVENT eid="e2" class="STATE">
experience
</EVENT>

```

months of renewed hostility

```

<TIMEX3 tid="t1">
months
</TIMEX3>
of renewed
<EVENT eid="e2" class="STATE">
hostility
</EVENT>

```

the future of our people

```

<TIMEX3 tid="t1">
the future
</TIMEX3>
of our people.

```

It is worth noticing the difference between the cases here and those in 2(d)iiA above, where the postmodifier introduces a temporal expression, and not an event.

Adverbial postmodifiers will be considered part of the TIMEX3 markable expression:

the best second quarter ever

```

<TIMEX3 tid="t1">
the best second quarter ever
</TIMEX3>

```

three years ago

```

<TIMEX3 tid="t1">
three years ago
</TIMEX3>

```

2.2.2 Attributes for TIMEX3

a. Timex ID number (tid) Non-optional attribute. Each TIMEX3 expression has to be identified by a unique ID number. This is automatically assigned by the annotation tool.

b. Type Non-optional attribute. Each TIMEX3 is assigned one of the following types: DATE, TIME or DURATION. **The value will be assigned relative to the interpretation of the TIMEX3 markable expression in the context of appearance.** For instance, a TIMEX3 tag containing *two months* will be given **type** DURATION in 1, whereas it will be given **type** DATE in 2. The scope of the TIMEX3 is marked by the square brackets:

1. *John stayed [two months] in Boston.*
2. *John arrived in Boston [two months ago] today.*

The following examples illustrate each possible **type** value. In them, the TIMEX3 markable expression is in bold face:

- **DATE:** The expression describes a calendar time.

Mr. Smith left **Friday, October 1, 1999**
the second of December
yesterday
in **October of 1963**
in **the summer of 1964**
on **Tuesday 18th**
in **November 1943**
this year's summer
two weeks from next Tuesday
last week

DATE can also be the value for the **type** attribute of each of the two TIMEX3 markable expressions constituting a range. E.g.,

John left between **Monday and Wednesday**

```
John left between
<TIMEX3 tid="t1" type="DATE">
Monday
</TIMEX3>
and
<TIMEX3 tid="t2" type="DATE">
Wednesday
</TIMEX3>
```

See Chapter 3 for a fully annotated version of the same example.

- **TIME:** The expression refers to a time of the day, even if in a very indefinite way (as in the two last examples below):

Mr. Smith left **ten minutes to three**
at **five to eight**
at **twenty after twelve**
at **half past noon**
at **eleven in the morning**
at **9 a.m. Friday, October 1, 1999**
the morning of January 31
late last night
last night

As before, TIME can also be the type value for each of two TIMEX3 markable expressions that together refer to a temporal range (e.g., *Mr. Smith left between 8:00 a.m. and 10:00 a.m.*).

- **DURATION**: The expression describes a duration. This value is assigned only to explicit durations like the following:

Mr. Smith stayed **2 months** *in Boston*
48 hours
three weeks
all last night
20 days *in July*
3 hours *last Monday.*

c. Value The attribute value (equivalent to VAL in TIMEX2) will be annotated exactly as specified in TIDES(02) sections 3.2. and 3.3. Note however that these sections also include the use of two additional attributes, ANCHOR_VAL and ANCHOR_DIR, which are not used in TimeML.

With the assistance of the annotation tool, the annotator will introduce as much information as is available both in the time expression and from the context. The following examples, from previous sections, partially illustrate the use of the value attribute for times of the day, dates and durations:

- Times of the day, and dates:

```
<TIMEX3 tid="t1" type="TIME" value="T24:00">
twelve o'clock midnight
</TIMEX3>
```

In case the text would include some reference to the specific date in which the time is anchored (e.g., *Last Friday's party didn't start till twelve o'clock midnight*, assuming that today is Friday, July 12, 2002), then the value attribute must also contain the date, and be: value="2002-07-05T24:00".

```
<TIMEX3 tid="t2" type="TIME" value="T11">
eleven in the morning
</TIMEX3>
```

The same comment as above applies here.

```
<TIMEX3 tid="t3" type="TIME" value="2001-01-12TEV">
Friday evening
</TIMEX3>
```

The value in the above example assumes that we know that the document creation time is Tuesday, January 8th, 2001.

```
<TIMEX3 tid="t4" type="TIME" value="1984-01-03T12:00">
twelve o'clock January 3, 1984
</TIMEX3>
```

We assume here that noon is intended.

```
<TIMEX3 tid="t5" type="DATE" value="XXXX-12-02">
the second of December
</TIMEX3>
```

Unless we know the year to which the text is anchoring the current temporal expression, the 'value' attribute will leave the year underspecified by means of placeholders: XXXX.

```
<TIMEX3 tid="t6" type="DATE" value="1964-SU">
summer of 1964
</TIMEX3>
```

```
He left between
<TIMEX3 tid="t1" type="TIME" value="T18:00">
6:00 p.m.
</TIMEX3>
and
<TIMEX3 tid="t1" type="TIME" value="T20:00">
8:00 p.m.
</TIMEX3>
```

In the previous and the following examples, the duration of the range will be conveyed by means of a pair of TLINKs linking the event with both its time or date of initiation, and its time or date of ending.

```
We'll be on a break from
<TIMEX3 tid="t1" type="DATE" value="XXXX-07-01">
July, 1
</TIMEX3>
to
<TIMEX3 tid="t1" type="DATE" value="XXXX-08-15">
August, 15
</TIMEX3>
```

- Durations:

```

<TIMEX3 tid="t1" type="DURATION" value="P4M">
4 months
</TIMEX3>

for
<TIMEX3 tid="t1" type="DURATION" value="PT20M">
20 minutes
</TIMEX3>
<TIMEX3 tid="t2" type="DATE" value="XXXX-07-08">
last Monday
</TIMEX3>

during
<TIMEX3 tid="t1" type="DURATION" value="P2D">
two entire days
</TIMEX3>
on
<TIMEX3 tid="t2" type="DATE" value="1999-SU">
the summer of 1999
</TIMEX3>

```

d. mod Optional attribute, inherited directly from the TIMEX2 MOD attribute. Its value is as specified in TIDES(02), section 3.4.

e. temporalFunction Binary attribute which expresses that the value of the temporal expression needs to be determined via evaluation of a temporal function. Temporal functions will be applied as a postprocess within the T3PO (TIMEX3 Parser Objects) module.

The value for this attribute will be positive for those cases that do not contain all the information necessary to fill the higher-order (left-hand) positions in the date value. Some examples are:

eleven in the morning
January, 31
late last night
last week

Note that even if the **value** attribute has been completely filled because the context provides the necessary information, the **temporalFunction** attribute should still receive a positive value so that the pertinent temporal function in T3PO can be tested to see if it can reproduce the value that the human annotator has assigned.

On the other hand, for cases in which the higher-order position of the value are filled **temporalFunction** should be assigned a negative value. Such cases include:

twelve o'clock January 3, 1984
summer of 1964
Friday, October 1, 1999

9 a.m. Friday, October 1, 1999

the morning of January 31, 1999

Durations will receive **true** as the value of the **temporalFunction** attribute, in the case of underspecification. Examples of expressions that will be assigned **true** for this attribute are the following, where the scope of the **TIMEX3** tag is in bold face:

in recent months

```
<TIMEX3 tid="t1" type="DURATION" value="PXM" temporalFunction="true">
```

during the following hours

```
<TIMEX3 tid="t1" type="DURATION" value="PXH" temporalFunction="true">
```

On the other hand, expressions of durations that will be assigned **false** as value of the **temporalFunction** attribute are:

for two months

48 hours

By default, the value introduced in **temporalFunction** will be positive, given that specific expressions like those immediately above seem to appear rarely in the corpora.

f. anchorTimeID Optional attribute. It introduces the ID of the **time expression** to which the **TIMEX3** markable is temporally anchored. Its value is then always a **timeID**. The relation between the event *left* and the time *Tuesday* in *He left on Tuesday* will be annotated by means of a **TLINK** (see section 2.5).

The temporal anchors that are annotatable are those outside the scope of the **TIMEX3** tag. Thus in the sequence *two weeks from next Tuesday, next Tuesday* is not going to be annotated as temporal anchor of *two weeks*. Instead, the temporal anchor for the whole **TIMEX3**-marked expression will be that relative to which the date for *next Tuesday* can be evaluated. Assume this corresponds to the date referred to by the **timeID** **t0**:

Mary will arrive two weeks from next Tuesday

```
<TIMEX3 tid="t1" type="TIME" value="2002-08-06"
  temporalFunction="true" anchorTimeID="t0">
  two weeks from next Tuesday
</TIMEX3>
```

Another example:

Mary left on Thursday and John arrived the day after.


```

Mary left
on
<TIMEX3 tid="t1" type="DATE"
value="1998-WXX-4" temporalFunction="true"
anchorTimeID="t0">
Thursday
</TIMEX3>
and John arrived
<TIMEX3 tid="t2" type="DATE"
value="1998-WXX-5" temporalFunction="true"
anchorTimeID="t1">
the day
</TIMEX3>
after

```

In this previous case, both TIMEX3 expressions require the application of a temporal function: *the day (after)* needs to be evaluated with respect to *Thursday*, and *Thursday* relative to another time reference, not explicit in the current example.

The TERQAS Workshop will resume Monday, July 15. The session will start at 9:00 a.m.

```

The TERQAS Workshop will resume
<TIMEX3 tid="t1" type="DATE" value="2002-07-15">
Monday, July 15
</TIMEX3>
. The session will start at
<TIMEX3 tid="t2" type="TIME" value="T9:00"
temporalFunction="true" anchorTimeID="t1">
9:00 a.m.
</TIMEX3>

```

Note that the presence of the `anchorTimeID` attribute appears together with `temporalAnchor='true'`. However, this is not always the case.

g. valueFromFunction This attribute is not relevant for the purposes of manual annotation, but only for the T3PO postprocess. The human annotator should ignore it.

h. functionInDocument This attribute indicates the function of a TIMEX3 in providing a temporal anchor for other temporal expressions in the document. There are several times that mark the major milestones in the life of a news resource:

- the time the story is created
- the time the story is modified
- the time the story is published
- the time it may be released (if not immediately)

- the time it is received by a customer
- the time that the story expires (if any)

The possible values for this attribute are then: 'CREATION_TIME', 'MODIFICATION_TIME', 'PUBLICATION_TIME', 'RELEASE_TIME', 'RECEPTION_TIME', 'EXPIRATION_TIME', 'NONE'.

If this attribute is not explicitly supplied, the default value is 'NONE'. The Document Creation Time will be annotated as:

```
<TIMEX3 tid="t1" type="DATE" functionInDocument="CREATION_TIME" value="1996-0327">
03-27-96
</TIMEX3>
```

2.2.3 BNF for the TIMEX3 tag

```
attributes ::= tid type (value | valueFromFunction) [mod] temporalFunction
              [anchorTimeID] [functionInDocument]  tid ::= t<integer>
type ::= 'DATE' | 'TIME' | 'DURATION'
value ::= CDATA
mod ::= CDATA
temporalFunction ::= ('true' | 'false') {default, if absent, is 'false'}
anchorTimeID ::= t<integer>
ValueFromFunction ::= t<integer>
functionInDocument ::= 'CREATION_TIME' | 'EXPIRATION_TIME' |
                      'MODIFICATION_TIME' | 'PUBLICATION_TIME' |
                      'RELEASE_TIME' | 'RECEPTION_TIME' | 'NONE'
```

2.3 The tag <SIGNAL>

A signal is a textual element that makes explicit either the relation holding between two entities (timex and event, timex and timex, or event and event) or the modality of an event or the fact that one verb refers to two or more separate events. Signals are generally:

- **Temporal prepositions:** *on, in, at, from, to, before, after, during, etc.*
- **Temporal conjunctions:** *before, after, while, when, etc.*
- **Temporal modifiers:** *twice, every, three times, etc.*
- **Negative expressions:** *not, no, none, never, nobody etc.*
- **Modals:** *might, may, could, should, would.*
- **Prepositions signaling modality:** *to.*
- **Special characters:** “-” and “/”, in temporal expressions denoting ranges (*September 4-6, Apr. 1999/Jul. 1999, etc.*).

2.3.1 How to annotate SIGNALs

Modals and Negative Expressions In simple cases modal verbs and negative expressions will not need to be tagged by human annotators, nor will the SLINKs they introduce (cf. section 2.5), since they will be annotated automatically via preprocessing. Here is such a case and an example of the annotation produced.

```
John <SIGNAL sid="s1"> might </SIGNAL> teach Monday
```

In cases where the surface expression is too complex for the preprocessor to identify the modal or negative and the associated subordinated verb, the annotator will have to tag the signal explicitly. For example, in sentences such as

John might, other things being equal, teach Monday.

the signal and associated SLINK may need to be manually added. In general material of any arbitrary nature and extent may appear between the modal or negative particle and the subordinated verb, and no preprocessing short of perfect parsing could correctly process all cases.

Temporal Prepositions, Conjunctions and Modifiers As for the other expressions, they will be tagged as illustrated in the following simple examples:

```
John taught <SIGNAL sid="s1"> on </SIGNAL> Monday
```

```
All passengers died <SIGNAL sid="s1"> when </SIGNAL>
the plane crashed into the mountain.
```

When two distinct signals appear side by side, they must be annotated separately, if they belong to different signal classes as listed above. Otherwise they must be annotated as a single SIGNAL. Contrast the two following examples:

```
John taught <SIGNAL sid="s1"> three times </SIGNAL>
<SIGNAL sid="s2"> on </SIGNAL> Monday
```

```
They will investigate the role of the US
<SIGNAL sid="s1">before, during and after</SIGNAL> the genocide
```

In this second case, the three temporal prepositions need to be collapsed into a single SIGNAL in order to properly recover the IS_INCLUDED relation of the TLINK between the *genocide* and the *role* events (see section 2.5).

2.3.2 Attributes for SIGNAL

SIGNAL has only one, non-optional, attribute: `sid`, the signal's unique id. It is automatically assigned by the annotation tool each time a SIGNAL is marked up.

2.3.3 BNF for the SIGNAL tag

```
attributes ::= sid
sid ::= s<integer>
```

2.4 The tag <MAKEINSTANCE>

We distinguish between event **tokens** and event **instances** or realisations – **MAKEINSTANCE** creates the actual realisation of an event. The motivation is examples like *John taught on Monday and Tuesday*, where one verb represents two events. In order to be able to annotate such cases, it is necessary to create two **instances** of *taught*, representing the two different events. **MAKEINSTANCES** are created **in addition** to the event annotation (which marks up the event token).

In most cases, only one **MAKEINSTANCE** is needed, and will be automatically created by the annotation tool, so the annotator only has to insert **additional MAKEINSTANCE** for the second (and further, if necessary) instance or realisation of an event. There are also cases, where the annotator can either create as many **MAKEINSTANCES** as motivated by the text or one **MAKEINSTANCE** which carries a cardinality value. Examples are the following:

1. *John taught twice on Monday.*
2. *John taught 150 times last year.*

In the first example, the annotator can either create two **MAKEINSTANCES** or one **MAKEINSTANCE** with cardinality two. In the second example, the only practical solution is to create one **MAKEINSTANCES** with cardinality 150.

2.4.1 How to annotate MAKEINSTANCES

We will use examples to demonstrate how to annotate **MAKEINSTANCES**. In these examples we will not give a detailed annotation of events, times and signals, so please refer to the appropriate sections for instructions on how to annotate them. We also only show the mark-up for those entities which are relevant to the examples.

A **MAKEINSTANCE** has to be created for each instance or realisation of an event – as many as are motivated by the text. Alternatively, the cardinality attribute may be used, e.g. for *every* and for large numbers. When the cardinality is small enough (e.g. *twice*), the annotator has a choice of creating one **MAKEINSTANCE** with the appropriate cardinality or creating as many **MAKEINSTANCES** as appropriate. We recommend using only one **MAKEINSTANCE**, unless individual events are referred to later in the text. Note that one **MAKEINSTANCE** will be automatically created for each event by the annotation tool, so the annotator only has to create additional **MAKEINSTANCES** when more than one event instance is referred to in the text. This is done by annotating or ‘swiping’ the event as many times as needed. Each ‘swipe’ will automatically create a new instance ID.

In each of the following examples the event *taught* is marked up as follows:

```
<EVENT eid="e1"> taught </EVENT>
```

1. *John taught on Monday*

This leads to one automatically created **MAKEINSTANCE**:

```
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
```

2. *John taught on Monday and Tuesday*

Since the teaching event has two different time values in this example, two **MAKEINSTANCES** are necessary. The first one will be automatically created, but the second one has to be created by the annotator:

```
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
<MAKEINSTANCE eiid="ei2" eventID="e1"/>
```

3. *John taught twice on Monday*

Since there is only one time expression in the text, the annotator has the choice of either creating a second MAKEINSTANCE or using the cardinality attribute. If two MAKEINSTANCE are created then they would look as follows (where *twice* is the signal with signalID="s1"):

```
<MAKEINSTANCE eiid="ei1" eventID="e1" signalID="s1"/>
<MAKEINSTANCE eiid="ei2" eventID="e1" signalID="s1"/>
```

If one MAKEINSTANCE were created instead then it would look as follows:

```
<MAKEINSTANCE eiid="ei1" eventID="e1" signalID="s1" cardinality="2"/>
```

4. *John taught every Monday*

The MAKEINSTANCE that is automatically introduced has to be changed to the following, where the SIGNAL *every* is referred to by signalID="s1"):

```
<MAKEINSTANCE eiid="ei1" eventID="e1" signalID="s1" cardinality="EVERY">
```

Currently, the annotation tool allows the annotator to create different MAKEINSTANCES by introducing an identification number (followed by a comma) in the last column of the links table, whenever a T-, S- or ALINK involving that particular instance is introduced.

2.4.2 Attributes for MAKEINSTANCE

```
attributes ::= eiid eventID [signalID] [cardinality]
```

2.4.3 BNF for the MAKEINSTANCE tag

```
eiid ::= ei<integer>
eventID ::= e<integer>
signalID ::= s<integer>
cardinality ::= <integer> | 'EVERY' | ...
```

2.5 The link tags: <TLINK>, <SLINK>, and <ALINK>

There are three types of links tags. The function of each will be introduced here, before we move on to explaining in detail how links are annotated.

- **TLINK:**

A TLINK or Temporal Link represents the temporal relationship holding between events or between an event and a time, and establishes a link between the involved entities making explicit if they are:

1. Simultaneous

Two events are judged simultaneous if they happen at the same time, or are temporally indistinguishable in context, i.e. occur close enough to the same time that further distinguishing their times makes no difference to the temporal interpretation of the text.

2. One **before** the other:

As in the following example between the events *slayings* and *arrested*:

*The police looked into the **slayings** of 14 women. In six of the cases suspects have already been **arrested**.*

3. One **after** the other:

This is just the inverse of the preceding relation. So the two events of the previous example can alternatively be annotated as expressing an **after** relation, if the directionality is changed.

4. One **immediately before** the other:

As in the following sentence between *crash* and *died*.

*All passengers **died** when the plane **crashed** into the mountain*

5. One **immediately after** than the other:

This is the inverse of the preceding relation.

6. One **including** the other:

As is the case between the temporal expression and the event in the following example:

*John **arrived** in Boston **last Thursday**.*

7. One **being included** in the other:

The inverse relation to the preceding one.

8. One **holds** during the other:

Specifically applicable to states or events that persist throughout a duration, for example:

*James was **CTO** for **two years**.
John **taught** for **20 minutes** on Monday.*

9. One being the **beginning** of the other:

As holds between the first of the temporal expressions and the event in the following example:

*John was **in the gym** between **6:00 p.m.** and **7:00 p.m.***

10. One being **begun by** the other:

The inverse relation to the one just introduced.

11. One being the **ending** of the other:

*John was **in the gym** between **6:00 p.m.** and **7:00 p.m.***

12. One being **ended by** the other:

The inverse relation to the one just introduced.

In addition, TLINKs are also used in the three following situations:

1. Event identity

Event identity is also annotated via the TLINK. **Note that event identity is a very important relationship, which will not be picked up during the closure part of the annotation. So please make sure that all identity links are annotated.**
E.g.:

John drove to Boston. During his drive he ate a donut.

2. **When a ‘set/subset’ relationship occurs in the text.**

An example is:

The police looked into the slayings of 14 women. In six of the cases suspects have already been arrested.

With the current version of TimeML we cannot capture this ‘set/subset’ relationship. What will be done for now is to create a MAKEINSTANCE for each of the ‘sets’, i.e. one MAKEINSTANCE for *slayings* with cardinality plural (or 14?) and one MAKEINSTANCE for *cases* with cardinality plural (or 6?) and then link these two instances via a TLINK with the temporal relationship IS_INCLUDED or INCLUDES.

3. **When two events that are temporally ordered are separated by an explicit duration of time.**

In the following example, for instance, the sending of the report occurred two months before the attack:

Two months before the attack, a report was sent.

A TLINK will be used in order to relate *sent* and *attack*. The interval of time will be conveyed by means of the attribute *magnitude* (see section 2.5.2), which will refer to the time ID of the temporal expression *two months*.

The fully annotated version of examples like this above are in Chapter 3, numbers: 5-9. Compare them with examples 1-4, 10 and 11.

• **SLINK:**

An SLINK or Subordination Link is used for contexts introducing relations between two events, or an event and a signal. SLINKs are of one of the following sorts:

1. **Modal:**

This relation is introduced mostly by modal verbs (**should, could, would**, etc.), which will be marked as SIGNALS (2.3), but also by events that introduce a reference to a possible world – mainly L_STATES:

*John **should** have bought some wine.*
*Mary **wanted** John to buy some wine.*

2. **Factive:**

Certain verbs introduce an entailment (or presupposition) of their argument’s veracity. They include **forget** in the tensed complement, **regret**, **manage**:

*John **forgot** that he was in Boston last year.*
*Mary **regrets** that she didn’t marry John. John **managed** to leave the party*

3. **Counter-factive:**

Contrary to the previous relation, in this case the event introduces a presupposition about the non-veracity of its argument: **forget (to)**, **unable to** (in past tense), **prevent, cancel, avoid, decline**, etc.

*John **forgot** to buy some wine.*
*Mary was **unable** to marry John. John **prevented** the divorce.*

4. **Evidential:**

Evidential relations are typically introduced by REPORTING or PERCEPTION events:

*John **said** he bought some wine.*
*Mary **saw** John carrying only beer.*

5. **Negative evidential:**

Introduced by REPORTING (and PERCEPTION?) events conveying negative polarity:

*John **denied** he bought only beer.*

6. **Negative:**

Introduced only by negative particles (*not, nor, neither, etc.*), which should be marked as SIGNALS, with respect to the events they are modifying:

*John **didn't** forget to buy some wine.*
*John **did not** want to marry Mary.*

For each REPORTING or PERCEPTION event, an SLINK has to be introduced. The SLINK expresses the relation between the REPORTING or PERCEPTION event and the main event in its subordinate clause. In the following example, the REPORTING and PERCEPTION events are in bold face, whereas the subordinate events are underlined:

*John **said** that he taught on Monday*
*John **saw** the plane crash into the building*

Similarly, for each LACTION or LSTATE an SLINK is introduced, which expresses the relation between the intensional event (in bold face) and its subordinated event (underlined):

*Israel has been **scrambling** to buy more masks abroad.*
*The local government **hopes** that residents will soon return to their homes*

• **ALINK:**

An ALINK or Aspectual Link represents the relationship between an aspectual event and its argument event. Examples of the aspectual relations to be encoded are:

1. **Initiation:**

*John **started** to read*

2. **Culmination:**

*John **finished** assembling the table.*

3. **Termination:**

*John **stopped** talking.*

4. **Continuation:**

*John **kept** talking.*

2.5.1 How to annotate LINKs

We use examples to demonstrate how to create each of the link types. In these examples we do not give detailed annotation of events, times and signals – please refer to the appropriate section for instructions on annotating these. Also, we only show the mark-up for those entities which are relevant to the examples.

NOTE that a link that originates in an event always links via an **event instance ID** (i.e. the ID used in the MAKEINSTANCE) rather than via the ID of the event token itself.

- **TLINK:**

A TLINK has to be created each time a temporal relationship holding between events or an event and a time needs to be annotated. This includes the important relationship of event identity. Examples:

1. *John taught on Monday*

The temporal relationship holding between the event and the time expression, as indicated by the signal, is marked up by introducing the following TLINK:

```
<TLINK eventInstanceID="ei1" relatedToTime="t1" signalID="s1"
      relType="IS_INCLUDED"/>
```

2. *John taught on Monday and Tuesday*

As explained in section 2.4 above, two MAKEINSTANCES represent the two instances of *taught*:

```
<MAKEINSTANCE eiid="ei1" eventID="e5"/>
<MAKEINSTANCE eiid="ei2" eventID="e5"/>
```

The temporal relationship holding between those two events and the two time expressions are annotated by introducing the following two TLINKs:

```
<TLINK eventInstanceID="ei1" relatedToTime="t1" signalID="s1"
      relType="IS_INCLUDED"/>
```

```
<TLINK eventInstanceID="ei1" relatedToTime="t2" signalID="s1"
      relType="IS_INCLUDED"/>
```

3. *John taught every Monday*

The MAKEINSTANCE representing the multiple instances of *taught* looks as follows:

```
<MAKEINSTANCE eiid="ei9" eventID="e4" signalID="s5"
      cardinality="EVERY"/>
```

The TLINK representing the temporal relation holding between the event(s) and the temporal expression looks like this:

```
<TLINK eventInstanceID="ei9" relatedToTime="t7"
      relType="IS_INCLUDED"/>
```

4. *John taught for 20 minutes on Monday.*

The MAKEINSTANCE representing the event *taught* looks as follows:

```
<MAKEINSTANCE eiid="ei4" eventID="e4"/>
```

Two TLINKs have to be introduced. One TLINK captures the fact that the *taught* event holds throughout the *20 minutes*, and one TLINK captures the fact that the *taught* event is included in *Monday*.

```
<TLINK eventInstanceID="ei4" relatedToTime="t2" signalID="s5"
      relType="HOLDS"/>
```

```
<TLINK tid="t2" relatedToTime="t3" signalID="s6"
      relType="IS_INCLUDED"/>
```

5. *John drove to Boston. During his drive he ate a donut.*

The MAKEINSTANCES presenting the events *drove* and *drive* look as follows:

```
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
```

```
<MAKEINSTANCE eiid="ei2" eventID="e2"/>
```

The TLINK that has to be introduced to represent the identity of these two events looks as follows:

```
<TLINK eventInstanceID="ei1" relatedToEvent="ei2" relType="IDENTITY"/>
```

Please note that we did not include the TLINK that would represent the temporal relationship between *ate* and *drive*.

6. *The police looked into the slayings of 14 women. In six of the cases suspects have already been arrested.*

The MAKEINSTANCES representing the events *slayings* and *cases* look as follows:

```
<MAKEINSTANCE eiid="ei1" eventID="e1" cardinality="14"/>
```

```
<MAKEINSTANCE eiid="ei2" eventID="e2" cardinality="6"/>
```

The TLINK that has to be introduced to represent the relationship between these two events looks as follows:

```
<TLINK eventInstanceID="ei1" relatedToEvent="ei2" relType="INCLUDES"/>
```

- **SLINK:**

SLINKs that relate two events link an event instance and an event type. On the other hand, SLINKs can relate SIGNALs (modals or negation particles) and event types. There will NOT be SLINKs linking two events and a SIGNAL.

1. *John said that he taught on Monday*

The two MAKEINSTANCES for the two events are the following:

```
<MAKEINSTANCE eiid="ei2" eventID="e2"/>
```

```
<MAKEINSTANCE eiid="ei3" eventID="e3"/>
```

To express the fact that the *taught* event is reported by the *said* event, the following SLINK is created:

```
<SLINK eventInstanceID="ei2" subordinatedEvent="e3"
      relType="EVIDENTIAL"/>
```

2. *John might teach on Monday*

The MAKEINSTANCES for the events are the following:

```
<MAKEINSTANCE eiid="ei4" eventID="e3"/>
<MAKEINSTANCE eiid="ei5" eventID="e4"/>
```

The SLINK that has to be created to represent the modality of *teach* looks as follows:

```
<SLINK eventInstanceID="ei4"
      subordinatedEventInstance="e5" relType="MODAL"/>
```

3. *John did not teach on Monday*

The MAKEINSTANCE for the event is the following:

```
<MAKEINSTANCE eiid="ei4" eventID="e3"/>
```

The SLINK that has to be created to represent the fact that the polarity of the *teach* event is negative looks as follows:

```
<SLINK eventInstanceID="ei4" signalID="s2" relType="NEGATIVE"/>
```

- **ALINK:**

ALINKS represent the relationship between aspectual verbs (and other expressions) and the event they refer to. Examples are:

1. *John started to read*

The two MAKEINSTANCES for the two events are the following:

```
<MAKEINSTANCE eiid="ei5" eventID="e2"/>
<MAKEINSTANCE eiid="ei6" eventID="e3"/>
```

The ALINK that has to be created between the aspectual verb *started* and the event *read* is the following:

```
<ALINK eventInstanceID="ei5" relatedToEvent="ei6"
      relType="INITIATES"/>
```

2. *John finished reading*

The two MAKEINSTANCES for the two events are the following:

```
<MAKEINSTANCE eiid="ei5" eventID="e2"/>
<MAKEINSTANCE eiid="ei6" eventID="e3"/>
```

The ALINK that has to be created between the aspectual verb *started* and the event *teach* is the following:

```
<ALINK eventInstanceID="ei5" relatedToEvent="ei6"
      relType="TERMINATES"/>
```

2.5.2 Attributes for LINKs

- **TLINK:**

1. **eventInstanceID** or **timeID**

Obligatory attribute (one or the other of these needs to be present). This is the ID of the **eventInstance** or the **timeID** involved in the temporal link.

2. **signalID**

Optional attribute. If the temporal relation holding between the entities is explicitly signalled in the text, then the ID of that signal needs to be supplied here.

3. **relatedToEvent** or **relatedToTime**

Obligatory attribute (one or the other of these needs to be present). This is the ID of the entity that is being related to the event instance with **ID=eventInstanceID** or time expression with **ID=timeID**.

4. **relType**

Obligatory attribute. This is the temporal relation holding between the entities. Possible values are: **BEFORE**, **AFTER**, **INCLUDES**, **IS_INCLUDED**, **HOLDS**, **SIMULTANEOUS**, **IAFTER**, **IBEFORE**, **IDENTITY**, **BEGINS**, **ENDS**, **BEGUN_BY**, **ENDED_BY**. These are assigned according to the instructions given at the beginning of section 2.5, on **TLINKs**. There will be only one relation assigned per **TLINK**.

5. **magnitude**

Optional attribute.

Attribute used when relating two events separated by a duration of time that is made explicit in the text. E.g.,

One month before the attack a report was sent.

magnitude ranges over the ID of **TIMEEX3** expression that represent the magnitude of the relation between the attack and the sending of the report (*one month*, etc.).

- **SLINK:**

1. **eventInstanceID**

Optional attribute. This is the ID of the **eventInstance** involved in the subordination link. **Note:** **eventInstanceID** is optional because an event can be subordinated (e.g. in a conditional or when an event is negated) without being subordinated to a particular event.

2. **subordinatedEvent** or **subordinatedEventInstance**

Obligatory attribute (one of them needs to be present). This is the ID of the subordinated event or event instance that the event instance with **ID=eventInstanceID** is related to.

3. **signalID**

Optional attribute. If the subordination relation holding between the events is explicitly signalled in the text, then the ID of that signal needs to be filled in here.

4. **relType**

Obligatory attribute. This is the temporal relation holding between the entities. Possible values are: **MODAL**, **NEGATIVE**, **EVIDENTIAL**, **NEG_EVIDENTIAL**, **FACTIVE**, **COUNTER-FACTIVE**. These are assigned according to the instructions given at the beginning of section 2.5, on **SLINKs**.

- **ALINK:**

1. **eventInstanceID**

Obligatory attribute. This is the ID of the (aspectual) eventInstance involved in the aspectual link.

2. **signalID**

Optional attribute. If the aspectual relation holding between the events is explicitly signalled in the text, then the ID of that signal needs to be filled in here. An example for a signal is *to* in *The ship began to sink*.

3. **relatedToEvent**

Obligatory attribute. This is the ID of the event related to the aspectual event.

4. **relType**

Obligatory attribute. This is the temporal relation holding between the entities. Possible values are: INITIATES, CULMINATES, TERMINATES, CONTINUES, REINITIATES

2.5.3 BNF for the link tags

- **TLINK:**

```

attributes ::= (eventInstanceID | timeID) [signalID]
              (relatedtoEvent | relatedtoTime) relType [magnitude]
eventInstanceID ::= ei<integer>
timeID ::= t<integer>
signalID ::= s<integer>
relatedToEvent ::= ei<integer>
relatedToTime ::= t<integer>
relType ::= 'BEFORE' | 'AFTER' | 'INCLUDES' | 'IS_INCLUDED' | 'HOLDS'
           'SIMULTANEOUS' | 'IAFTER' | 'IBEFORE' | 'IDENTITY' |
           'BEGINS' | 'ENDS' | 'BEGUN_BY' | 'ENDED_BY'
magnitude ::= t<integer>

```

- **SLINK:**

```

attributes ::= [eventInstanceID]
              (subordinatedEvent | subordinatedEventInstance)
              [signalID] relType [polarity]
eventInstanceID ::= ei<integer>
subordinatedEvent ::= e<integer>
subordinatedEventInstance ::= ei<integer>
signalID ::= s<integer>
relType ::= 'MODAL' | 'NEGATIVE' | 'EVIDENTIAL' | 'NEG_EVIDENTIAL' |
           'FACTIVE' | 'COUNTER_FACTIVE'

```

- **ALINK:**

```
attributes ::= eventInstanceID [signalID] relatedToEvent relType
eventInstanceID ::= ei<integer>
signalID ::= s<integer>
eventID ::= e<integer>
relType ::= 'INITIATES' | 'CULMINATES' | 'TERMINATES' | 'CONTINUES' | 'REINITIATES'
```

Chapter 3

Completely annotated examples

Assume for all the examples that the document creation time (DCT) is marked up as a `TIMEX3` expression with `tid="t0"`.

3.1 Complex TIMEX Examples

1. *John left 2 days before yesterday.*

```
John
<EVENT  eid="e1" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
left
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
<TIMEX3 tid="t1" type="DATE" value="2002-07-08"
        anchorTimeID="t0" temporalFunction="true"
        valueFromFunction="tf1">
2 days before yesterday
</TIMEX3>

<TLINK eventInstanceID="ei1" relatedToTime="t1" relType="IS_INCLUDED"/>
```

We don't split the temporal expression into smaller components (i.e., "two days" and "yesterday"). Similarly, we do not tag "before" as a `SIGNAL`, but as part of the `TIMEX3` expression instead.

The `type` attribute of the `TIMEX3` denotes a `DATE` (the date in which John left), which can be computed by a temporal function relative to the temporal anchor "t0" (the DCT).

2. *I'm leaving on vacation two weeks from next Tuesday.*

```
I'm
<EVENT  eid="e1" class="OCCURRENCE" tense="FUTURE" aspect="PROGRESSIVE">
leaving
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
on vacation
```

```

<TIMEX3 tid="t1" type="DATE" value="2002-07-23"
  anchorTimeID="t0" temporalFunction="true"
  valueFromFunction="tf1">
two weeks from next Tuesday
</TIMEX3>

<TLINK eventInstanceID="ei1" relatedToTime="t1" relType="IS_INCLUDED"/>

```

3. *A major earthquake struck Los Angeles three years ago today.*

```

A major
<EVENT eid="e1" class="OCCURRENCE" tense="NONE" aspect="NONE">
earthquake
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
<EVENT eid="e2" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
struck
</EVENT>
<MAKEINSTANCE eiid="ei2" eventID="e2"/>
Los Angeles
<TIMEX3 tid="t1" type="DATE" value="1999-07-12"
  anchorTimeID="t0" temporalFunction="true"
  valueFromFunction="tf1">
three years ago today
</TIMEX3>

<TLINK eventInstanceID="ei1" relatedToEvent="ei2" relType="IBEFORER"/>
<TLINK eventInstanceID="ei1" relatedToTime="t1" relType="IS_INCLUDED"/>

```

4. *John left 2 days ago.*

```

John
<EVENT eid="e1" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
left
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
<TIMEX3 tid="t1" type="DATE" value="2002-07-08"
  temporalFunction="true" anchorTimeID="t0"
  valueFromFunction="tf1">
2 days ago.
</TIMEX3>

<TLINK eventInstanceID="ei1" relatedToTime="t1" relType="IS_INCLUDED"/>

```

Note that *ago* is NOT a signal but a part of the TIMEX3 expression.

The TIMEX3 expression returns a DATE (not a DURATION), which needs to be computed by a temporal function relative to the DCT or the Speech time. *2 days ago* is ALWAYS a

DATE computed relative to the DCT, in contrast to expressions like "2 days before", which necessarily relate two events and thus introduce a TLINK with the `magnitude` attribute. This can be observed in the 3 following examples.

5. *John left 2 days before the attack.*

```
John
<EVENT  eid="e1" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
left
</EVENT>
<MAKEINSTANCE  eiid="ei1" eventID="e1"/>
<TIMEX3  tid="t1" type="DURATION" value="P2D" temporalFunction="false">
2 days
</TIMEX3>
<SIGNAL  sid="s1">
before
</SIGNAL>
the
<EVENT  eid="e2" class="OCCURRENCE" tense="NONE" aspect="NONE">
attack
</EVENT>
<MAKEINSTANCE  eiid="ei2" eventID="e2"/>

<TLINK  eventInstanceID="ei1" signalID="s1" relatedToEvent="ei2"
relType="BEFORE" magnitude="t1"/>
```

6. *5 days after he came back Mary got sick.*

```
<TIMEX3  tid="t1" type="DURATION" value="P5D" temporalFunction="false">
5 days
</TIMEX3>
<SIGNAL  sid="s1">
after
</SIGNAL>
he
<EVENT  eid="e1" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
came
</EVENT>
<MAKEINSTANCE  eiid="ei1" eventID="e1"/>
back Mary
<EVENT  eid="e2" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
got
</EVENT>
<MAKEINSTANCE  eiid="ei2" eventID="e2"/>
sick.

<TLINK  eventInstanceID="ei1" signalID="s1" relatedToEvent="ei2"
relType="BEFORE" magnitude="t1"/>
```

7. *Two months before the attack, a report was sent.*

```

<TIMEX3 tid="t1" type="DURATION" value="P2M" temporalFunction="false">
Two months
</TIMEX3>
<SIGNAL sid="s1">
before
</SIGNAL>
the
<EVENT eid="e1" class="OCCURRENCE" tense="NONE" aspect="NONE">
attack
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
a report was
<EVENT eid="e2" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
sent
</EVENT>
<MAKEINSTANCE eiid="ei2" eventID="e2"/>

<TLINK eventInstanceID="ei1" signalID="s1" relatedToEvent="ei2"
relType="AFTER" magnitude="t1"/>

```

The TIMEX3 expression here is considered here to be of `type=DURATION`, since it establishes the length of the interval separating the 2 events. As such, the value for the `value` attribute is already known (P2D, P5M, etc.) and therefore the `temporalFunction` attribute returns `false` as its value.

There is only one TLINK relating the two events, which introduces both the `magnitude` attribute (pointing to the ID of the TIMEX3 expression) and the `signalID` attribute.

3.2 Complex TLINK and SLINK Examples

1. *The attack was not expected at all, although a report had been sent 2 months before.*

```

The
<EVENT eid="e1" class="OCCURRENCE" tense="NONE" aspect="NONE">
attack
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
was
<SIGNAL sid="s1">
not
</SIGNAL>
<EVENT eid="e2" class="I_STATE" tense="PAST" aspect="PERFECTIVE">
expected
</EVENT>
<MAKEINSTANCE eiid="ei2" eventID="e2"/>

```

```

at all, although a report had been
<EVENT eid=e3>
sent
</EVENT>
<MAKEINSTANCE eiid="ei3" eventID="e3"/>
<TIMEX3 tid="t1" type="DURATION" val="P2M" temporalFunction="false">
2 months
</TIMEX3>
<SIGNAL sid=s2>
before
</SIGNAL>

<SLINK eventInstanceID="ei2" signalID="s1" relType="NEGATIVE"/>
<SLINK eventInstanceID="ei2" subordinatedEvent="e1" relType="MODAL"/>
<TLINK eventInstanceID="ei1" relatedToEvent="ei3" relType="AFTER"
      magnitude="t1" signalID="s2"/>

```

2. *Mary arrived yesterday but John left 2 days before.*

```

Mary
<EVENT eid="e1" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
arrived
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
<TIMEX3 tid="t1" type="DATE" value="2002-07-09"
      temporalFunction="true" anchorTimeID="t0"
      valueFromFunction="tf1">
yesterday
</TIMEX3>
but John
<EVENT eid="e2" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
left
</EVENT>
<MAKEINSTANCE eiid="ei2" eventID="e2"/>
<TIMEX3 tid="t2" type="DURATION" value="P2D" temporalFunction="false">
2 days
</TIMEX3>
<SIGNAL sid="s1">
before.
</SIGNAL>

<TLINK eventInstanceID="ei1" signalID="s1" relatedToEvent="ei2"
relType="AFTER" magnitude="t2"/>
<TLINK eventInstanceID="ei1" relatedToTime="t1" relType="IS_INCLUDED"/>

```

The two events are related by means of a TLINK. In addition there is a second TLINK relating the event linked to the date (*arrived*) and this date (*yesterday*).

3. *She was sick after the play.*

```

She was
<EVENT eid="e1" class="STATE" tense="NONE" aspect="NONE">
sick
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
<SIGNAL sid="s1">
after
</SIGNAL>
the
<EVENT eid="e2" class="OCCURRENCE" tense="NONE" aspect="NONE">
play
</EVENT>
<MAKEINSTANCE eiid="ei2" eventID="e2"/>

<TLINK eventInstanceID="ei1" signalID="s1" relatedToEvent="ei2"
relType="AFTER"/>

```

The TLINK does not introduce magnitude.

4. *She was sick for 2 hours after the play.*

```

She was
<EVENT eid="e1" class="STATE" tense="NONE" aspect="NONE">
sick
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
<SIGNAL sid="s1">
for
</SIGNAL>
<TIMEX3 tid="t1" type="DURATION" value="P2H" temporalFunction="false">
2 hours
</TIMEX3>
<SIGNAL sid="s2">
after
</SIGNAL>
the
<EVENT eid="e2" class="OCCURRENCE" tense="NONE" aspect="NONE">
play
</EVENT>
<MAKEINSTANCE eiid="ei2" eventID="e2"/>

<TLINK eventInstanceID="ei1" signalID="s1" relatedToTime="t1"
relType="HOLDS"/>
<TLINK eventInstanceID="ei1" signalID="s2" relatedToEvent="ei2"
relType="AFTER"/>

```

There are two TLINKs: The first one introduces the holding relation between the state of being sick and the time it took (2 hours). The second one states the ordering of the two events. Since there is no explicit reference to the duration of the interval between the two events, the second TLINK does not introduce the *magnitude* attribute.

5. *John taught for 20 minutes every Monday.*

One EVENT, two TIMEX3s and two SIGNALs need to be created. In addition, the following tags are needed:

- (a) One MAKEINSTANCE with cardinality *every*, as signaled by the expression *every*.
- (b) One TLINK linking the duration *20 minutes* to the event.
- (c) One TLINK linking the TIMEX3 *Monday* to the TIMEX3 *20 minutes*.

```
John
<EVENT eid="e4" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
taught </EVENT>
<SIGNAL sid="s5">for</SIGNAL>
<TIMEX3 tid="t2" type="DURATION" value="PT20M" anchorTimeID="3">
  20 minutes</TIMEX3>
<SIGNAL sid="s6">every</SIGNAL>
<TIMEX3 tid="t3" type="DATE" value="XXXX-WXX-1">Monday</TIMEX3>
<MAKEINSTANCE eiid="ei4" eventID="e4" signalID="s6" cardinality="EVERY"/>
<TLINK eventInstanceID="ei4" relatedToTime="t2" signalID="s5"
  relType="HOLDS"/>
<TLINK timeID="2" relatedToTime="t3" relType="IS_INCLUDED"/>
```

6. *John left between Monday and Wednesday*

```
John
<EVENT eid="e1" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
left
</EVENT>
<MAKEINSTANCE eiid="ei1" eventID="e1"/>
<SIGNAL sid="s1"/>
between
</SIGNAL>
<TIMEX3 tid="t1" type="DATE" value="2002-07-15"
  temporalFunction="true" anchorTimeID="t0"
  valueFromFunction="tf3"/>
Monday
</TIMEX3>
and
<TIMEX3 tid="t2" type="DATE" value="2002-07-17"
  temporalFunction="true" anchorTimeID="t0"
  valueFromFunction="tf3"/>
Wednesday
</TIMEX3>
```

```
<TLINK eventInstanceID="ei1" relatedToTime="t1" signalID="s1" relType="IAFTER"/>
<TLINK eventInstanceID="ei1" relatedToTime="t2" signalID="s1" relType="IBEFORE"/>
```

This current solution is not completely adequate, but we will keep it temporarily.

7. *John taught from 1994 through 1999.*

In this case, one EVENT and the two TIMEX3s need to be created. In addition, the following tags are needed:

- (a) One automatically created MAKEINSTANCE for the event.
- (b) One TLINK to capture the fact that the event started in 1994.
- (c) One TLINK to capture the fact that the event finished in 1999.

This then should lead to a duration, which is automatically created by the closure part of the tool.

John

```
<EVENT eid="e4" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
taught</EVENT>
<SIGNAL sid="s5">from</SIGNAL>
<TIMEX3 tid="t2" type="DATE" value="1994">1994</TIMEX3>
<SIGNAL sid="s6">through</SIGNAL>
<TIMEX3 tid="t3" type="DATE" value="1999">1999</TIMEX3>

<MAKEINSTANCE eiid="ei4" eventID="e4"/>
<TLINK eventInstanceID="ei4" relatedToTime="t2" signalID="s5"
      relType="BEGUN_BY"/>
<TLINK eventInstanceID="ei4" relatedToTime="t3" signalID="s6"
      relType="ENDED_BY"/>
```

8. *John did not leave on Monday but on Tuesday.*

One EVENT, two event instances, and three SIGNALs need to be created:

```
John did <SIGNAL sid="s5">not</SIGNAL>
<EVENT eid="e4" class="OCCURRENCE" tense="PAST" aspect="PERFECTIVE">
leave</EVENT>
<SIGNAL sid="s6">on</SIGNAL>
<TIMEX3 tid="t3" type="DATE" value="XXXX-WXX-1">Monday</TIMEX3>
but
<SIGNAL sid="s7">on</SIGNAL>
<TIMEX3 tid="t4" type="DATE" value="XXXX-WXX-2">Tuesday</TIMEX3n>
<MAKEINSTANCE eiid="ei1" eventID="e4"/>
<MAKEINSTANCE eiid="ei2" eventID="e4"/>
<SLINK subordinatedEventInstance="ei1" signalID="s5"
      relType="NEGATIVE" polarity="false"/>
<TLINK eventInstanceID="ei1" relatedToTime="t3" signalID="s6"
```

```

    relType="IS_INCLUDED"/>
<TLINK eventInstanceID="ei2" relatedToTime="t4" signalID="s7"
    relType="IS_INCLUDED"/>

```

3.3 Causative Examples

1. *The rains caused the flooding.*

```

The
<EVENT eid="e1" class="OCCURRENCE">
  rains
</EVENT>
<EVENT eid="e2" class="OCCURRENCE">
  caused
</EVENT>
the
<EVENT eid="e3" class="OCCURRENCE">
  Flooding
</EVENT>

<TLINK eventInstanceID=e1 relatedtoEvent=e3 relType="BEFORE" />
<TLINK eventInstanceID=e1 relatedtoEvent=e2 relType="IDENTITY" />

```

2. *John caused the fire.*

```

John
<EVENT eid="e1" class="OCCURRENCE">
  caused
</EVENT>
the
<EVENT eid="e2" class="OCCURRENCE">
  fire
</EVENT>
<TLINK eventInstanceID=e1 relatedtoEvent=e2 relType="BEFORE" />

```

3. *Kissinger secured the peace at great cost.*

```

Kissinger
<EVENT eid="e1" class="OCCURRENCE">
  secured
</EVENT>
the
<EVENT eid="e2" class="OCCURRENCE">
  peace
</EVENT>
<TLINK eventInstanceID=e1 relatedtoEvent=e2 relType="BEFORE" />
At great cost.

```

4. *He kicked the ball, and it rose into the air.*

Discourse relations acting as a causative, we are currently unable to handle as causatives, but we can certainly annotate the temporal relation that exists in the text.

```
He
<EVENT eid="e1" class="OCCURRENCE">
Kicked
</EVENT>
The ball
And
it
<EVENT eid="e2" class="OCCURRENCE">
rose
</EVENT>
Into the air
<TLINK eventInstanceID=e1 relatedtoEvent=e2 relType="BEFORE" />
```


Bibliography

- L. Ferro, L. Gerber, I. Mani, B. Sundheim, and G. Wilson. TIDES. Instruction Manual for the Annotation of Temporal Expressions. Technical Report Interim Draft for Terqas Workshop, The MITRE Corporation, 2002.
- B. Ingria and J. Pustejovsky. TimeML specification 1.0. (internal version 3.0.9). TERQAS Workshop documentation, 2002.
- A. Setzer. *Temporal Information in Newswire Articles: an Annotation Scheme and Corpus Study*. PhD thesis, Sheffield University, 2001.