# Temporal Relation Annotation Guidelines

### Version 3.0

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# Introduction

This document presents guidelines for temporal annotation, tailored to the annotation of economic news. These guidelines in many ways are a streamlining of TimeML[1], from which they draw deep inspiration.

The document details the tag and link types with examples and is organized as follows. First, a description of different situations in which events should be tagged, considering both verbal and nominal cases. Next is a description of time expressions and their associated tags. Finally, a description of time links and the criteria for their use tagged events to preceding events and time expression to events.

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[1] https://catalog.ldc.upenn.edu/docs/LDC2006T08/timeml_annguide_1.2.1.pdf

# Tag Types and Annotation Guidelines

## <EVENT>

Events can take a number of forms in natural language.  As explained in the guidelines for TimeML, they can range in form from "tensed or untensed verbs (1 and 2), nominalizations (3), adjectives (4), predicative clauses (5), or prepositional phrases (6)", providing the following examples for clarity:

1. A fresh flow of lava, gas and debris **erupted** there Saturday.
2. Prime Minister Benjamin Netanyahu called the prime minister of the Netherlands t**o 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. 6. All 75 people **on board** the Aeroflot Airbus died.

In terms of the annotation schema for annotating the most relevant events within economic news, a more streamlined approach will be taken;  tensed or untensed verbs and some nominalizations will be considered as candidates for event tagging, with strategies for dealing with events denoted in more complex predicates, like particle verbs (e.g. *pick up*), light verb constructions (e.g. *take into consideration*) and longer verbal sequences  (e.g. *has been struggling, got arrested*).

## Verbs

Tensed and untensed verbs are to be tagged as events. In all cases, the main verb is to be tagged. If the main verb of the sequence is a light verb like *take* followed by a normalization (e.g. *take into consideration)* or if the main verb in the clause is the copula (e.g. *She is a former board member*) please refer to the event tagging for nominalizations.

### Tensed Verbs

The main verb within a clause, along with all bound morphemes on the main verb should be tagged as an event.

1. The Nasdaq composite index **fell** 0.2 percent, to 2,190.31.

## Untensed Verbs

In the case of an untensed verb only tag the main verb of the verbal phrase leaving *to* and any other particles untagged.

1. The S&P 500 added less than 0.1 percent, to **close** at 1,106.41.

## Particle Verbs and Phrasal Verbs

For particle verbs only the main verb of the verbal constituent is to be tagged, any particles such as *up* should be left up tagged.

1. U.S. stocks **inched** up last week, overcoming concern that credit losses will rise, as data on jobless claims and retail sales signaled the economic recovery is strengthening.
2. The Senate is scheduled to reconvene after a holiday recess on Jan. 19, and banking committee Chairman Christopher J. Dodd (D-Conn.) expects the body will only then **take** up Bernanke's confirmation.

For phrasal verbs, only the main verb should be tagged.

1. Some senators who voted to **move** the nomination forward did not commit to voting for his confirmation on the Senate floor.

## Verbal Sequences

In the case of verbal sequences with any preceding modals or future marker *will*, light verbs (e.g. *got*), auxiliary verbs, negation or otherwise, tag only the main verb in the sequence.

1. Sen. Bernard Sanders (I-Vt.) has **said** he will **put** a hold on the nomination [...].
2. [...] a procedural step that could **delay** a vote and means that Bernanke would **need** 60 votes to remain chairman.
3. Some senators who voted to move the nomination forward did not **commit** to voting for his confirmation on the Senate floor.
4. The board voted unanimously to create a Century Date Change Special Liquidity Facility, which will let banks **borrow** funds at a rate 1.5 percentage points above the Fed's target for the federal funds rate, which is 5%.

Verbs in a sequences that convey aspect should be tagged as events, as should the related verbal event.

1. Last night, the House **began** its second **attempt** to pass a banking bill after failing last week, in part because of disagreement over how to allow banks into the securities business.
2. Though the Fed has been credited with helping prevent many banks and firms from collapsing as credit markets **stopped functioning**, critics also say the Fed overreached and the latest disclosures could open new fault lines.

## Nominalizations

Events can be expressed in some instances as nominalizations. Often these nouns are "verbal nouns", that is verb roots with nominalizing morphology (e.g. *speculate, speculation*) or will have time expressions associated with them (e.g. *in six years* in example 1 below).

### Nouns

In the case of an nominal expression of an event, only the head noun in the noun phrase should be tagged as an event.

1. Delta Air Lines gained 13 percent and US Airways Group surged 9 percent as crude oil extended its decline to eight straight days, the longest losing **streak** in six years.
2. [...] a reduction in Greece's debt rating added to **speculation** that global credit markets are struggling to recover.

### Light Verb Constructions

If a noun is part of a construction using a light verb only tag the nominalization as the event, leaving the light verb untagged.

1. And the stock market is starting to take **notice**.
2. You're going to have to understand where all the capital is going to come from during the life cycle, because otherwise it doesn't make **sense** for a venture capitalist.

### Copula Constructions

If the main verb in the clause is the copula, please mark the attributive predicate of the copula as the event.
1. She is a former board **member** of the Regional Plan Association.
2. [...] he is "very **cynical**" about the recent bond market rally [..]

# <TIMEX>

The temporal expression (TIMEX) tag marks any explicit temporal expressions, such as times, dates, durations, etc. Some common types of temporal expressions are:

- Calendar date (Friday, March 1, 2019)
- Times of the day (12 o'clock)
- Indefinite time (late last night)
- Duration (24 hours)
- Frequency (every two weeks)

## Single Time Expressions

When assigning a single temporal expression tag to a time expression, the scope of the tag should cover the expression in full, even in the case of a single multi-word temporal expressions, including adverbial postmodifiers in time expressions, (e.g. three years *ago*, the best quarter *ever*).

1. *Late yesterday afternoon* in New York, the euro was at 98.77 cents, slightly stronger than its 98.68-cent level *late Wednesday*.
2. [...] the Senate starts voting on the measure, perhaps *today*.
3. The Dow Jones Industrial Average kicked off the second quarter by touching the highest point since the *summer of 2008* [...]

## Interval Time Expressions

For interval time expressions, assign separate temporal expression tags to each of the component time expressions, then link the two using the appropriate temporal link. Interval time expressions are usually connected by prepositions and/or conjunctions like *from, before, after, following,* or *prior to*, etc,.

1. In the *six quarters* prior to the *May 2003* Bush tax cuts, GDP grew at an average annual quarterly rate of 1.8%.
2. From *1971* to *1978*, Warburg Pincus and its affiliated partnerships invested $15 million in Waste Management Co.; it cashed out in 1981 for $66 million.

# \<TLINK\>

A temporal link (TLINK) represents the temporal relationship holding between events, between an event and a time expression or between two time expressions.

For all temporal links, indicate the character of the relationship between the two entities as one in the following taxonomy. If no relation can be inferred from the given text between two adjacent events, then no temporal link between the two should be created.

## Temporal Link Taxonomy

### After

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

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

In this text, *slayings* is the event immediately in front of the event *arrested* in position. As in event-to-event linking, we link every event only to the adjacent event which is immediately in front of it, so *arrested* is related to *slaying* in the sense of after.

### Before

This is just the inverse of the succeeding relation. So, the two events of the previous example can alternatively be annotated as expressing a before relation, if the position order of the two events is reversed.

### Overlap

This includes all cases if two events overlap one another no matter only in part or in whole, i.e. they can happen simultaneously, or one includes another, or one overlaps with another. As *hummed* and *listened* in the following example:

1. Kristen *hummed* along with the song as she *listened* to it.

It could be that Kristen only hummed at the beginning of the song, or the chorus part of the song, or every other line, or the whole song, as long as there's some overlapping part between the two events.

As in the following example between *plan* and *leave*, *leave* is unrealized to *plan*:

1. I *plan* to *leave*.

The action of leaving has not occurred with relation to the plan event.

## Event/Event

For a temporal link between events, only link an event to the immediately preceding event in the text. Indicate the nature of the link from the above taxonomy.

## Temporal Expression/Event

For a temporal link between an event and a time expression, indicate the nature of the link between the time expression and the event as one in the above taxonomy.

## Temporal Expression/Temporal Expressions

For temporal links between two time expressions, indicate the nature of the link between the time expression. Please refer to the section on *Interval Time Expressions* above.

# Instructions for Annotating Using MAE

## Set-up

For the current project we are using an annotation tool called Multi-document Annotation Environment (MAE)[2]. The latest version can be downloaded at
https://github.com/keighrim/mae-annotation/releases

The MAE setup file (.dtd) and the data (.xml) for the current project can be found at
https://github.com/sheetskristen/temporal-annotation

To begin annotation, open MAE, load the setup file in File > New Task Definition. Then load data in File > Open Document.

## Tags

To mark an event or a time expression, select the text and right click. Choose the appropriate tag (EVENT or TIMEX) in "Create Extent Tag with selected text".

## Links

To mark a time link, right click anywhere to find "Create Link Tag with no arguments associated". This will create an empty TLINK. Then select the text that have been tagged to set them as arguments to the TLINK. Specify the link type and name in the pop-up window.

The *from* and *to* events or temporal expressions in a link construction should be relative to the linear order in the text, the *from* event or temporal expression should be the one that occurs first in linked sequence, the *to* event or temporal expression should be the one that occurs second in linked sequence.

To indicate the link type, type the name of the type (after, before, overlap or unrealized) in the appropriate column (see screenshot below).

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[2] http://keighrim.github.io/mae-annotation/

MAE 2.2.9

File    Tags    Mode    Display    Preferences    Help

*ECON-NEWS-1_1.xml    x

```
1  <UNIT_ID="_unit_id">
2      <ARTICLE_DATE>date</ARTICLE_DATE>
3      <TEXT>text</TEXT>
4  </UNIT_ID>
5  <UNIT_ID="842613457">
6      <ARTICLE_DATE>11/14/91</ARTICLE_DATE>
7      <TEXT>WASHINGTON -- In an effort to achieve banking reform, Senate negotiators and the Bush
   administration have agreed to drop efforts to allow banks to expand further into the securities
   business.The compromise is one of several the Senate Banking Committee is pursuing to remove
   obstacles its banking bill will face when the Senate starts voting on the measure, perhaps today. The
   latest version of the House banking bill also drops the administration's proposals to broaden bank
   entry into the securities business.Last night, the House began its second attempt to pass a banking
   bill after failing last week, in part because of disagreement over how to allow banks into the
   securities business. The House adopted on a voice vote provisions that would replenish the bank
   deposit insurance fund, tighten bank regulation, trim the scope of deposit insurance, and restrict
   the Federal Reserve Board's ability to keep sick banks alive with loans.But the House delaved until
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Selected: 272~278

☑ All Extents    ⬛ EVENT    ⬛ TIMEX    ⬜ TLINK

| id | fromID | fromText | toID | toText | before | overlap | after | unrealized |
|----|--------|----------|------|--------|--------|---------|-------|------------|
| TL0 | | | | | | | | |
| TL1 | E0 | reform | E1 | agreed | | overlap | | |