

AMR at JHU Summer Workshop

Abstract Meaning Representation vs. Tectogrammatics



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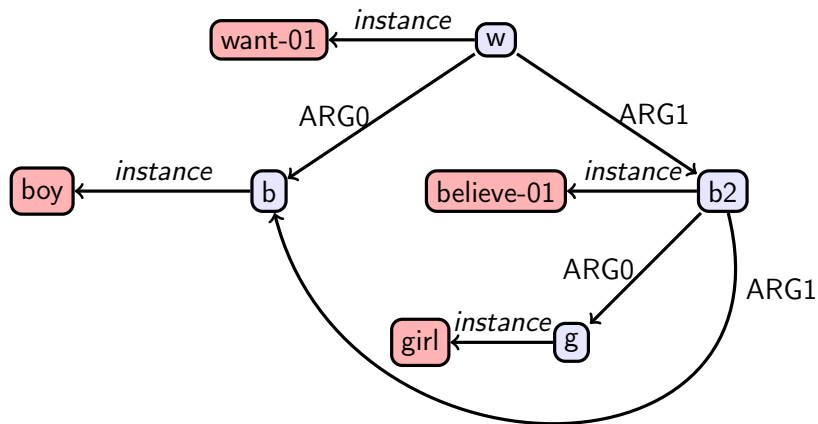
JHU Summer Workshop 2014 in Prague

- ▶ **ASR** Machines That Know When They Do Not Know; led by Hynek Heřmanský
- ▶ **PRELIM** Probabilistic Representations of Linguistic Meaning, led by Jason Eisner and Ben Van Durme
- ▶ **CLAMR** Cross-Lingual Abstract Meaning Representations for Machine Translation; led by Martha Palmer
 - ▶ **Graph-theoretic** team (Dan Gildea, David Chiang, Adam Lopez, Giorgio Satta, Naomi Saphra,...)
 - ▶ **AMR Parsing** team (Jeff Flanigan, Xiaochang Peng, Chuan Wang, Yuchen Zhang, Wei-te Chen,...)
 - ▶ **Tecto-to-AMR** team (Tim O’Gorman, Ondřej Bojar, Ondřej Dušek, Roman Sudarikov, Zdeňka Urešová, Silvie Cinková, Martin Popel,...)

Motivation for Tecto-to-AMR

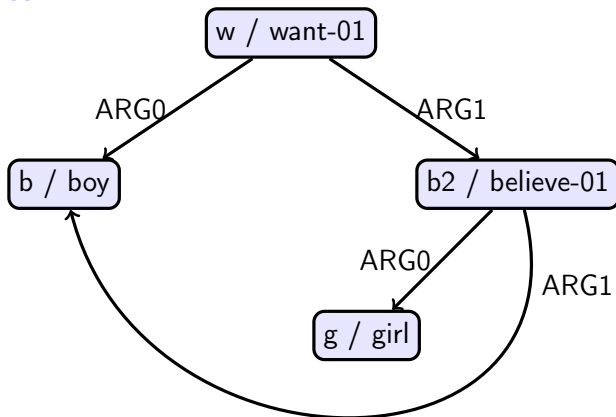
- ▶ convert PCEDT and CzEng to AMR
 - ▶ much more (almost) manual data
 - ▶ much more parallel training data
- ▶ (yet another) pipeline for AMR parsing
- ▶ explore the differences between
 - ▶ AMR and Tecto
 - ▶ Czech and English AMR

AMR basics



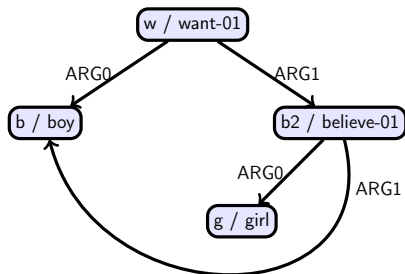
- ▶ The boy wants the girl to believe him.
- ▶ The boy wants to be believed by the girl.
- ▶ The boy has a desire to be believed by the girl.
- ▶ The boy's desire is for the girl to believe him.
- ▶ The boy is desirous of the girl believing him.

AMR basics



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AMR basics



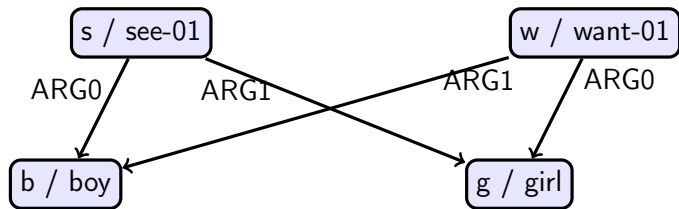
Penman format

```
(w / want-01
  :ARG0 (b / boy)
  :ARG1 (b2 / believe-01
    :ARG0 (g / girl)
    :ARG1 b))
```

Triples format

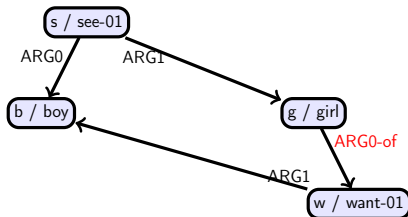
```
instance(w, want-01)
instance(b, boy)
instance(b2, believe-01)
instance(g, girl)
ARG0(w, b)
ARG1(w, b2)
ARG0(b2, g)
ARG1(b2, b)
```

AMR basics – inverse roles and re-focusing



- ▶ The boy saw the girl. The girl wants the boy.
- ▶ The boy saw the girl who wanted him.
- ▶ The boy saw the girl who he was wanted by.
- ▶ The girl who wanted the boy was seen by him.

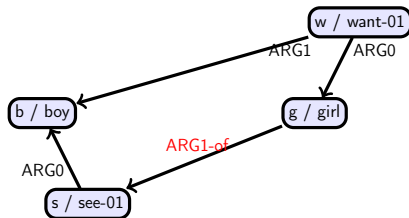
AMR basics – inverse roles and re-focusing



- ▶ The boy saw the girl who wanted him.
- ▶ The boy saw the girl who he was wanted by.
- ▶ The girl who wanted the boy was seen by him.

```
(s / see-01
 :ARG0 (b / boy)
 :ARG1 (g / girl
   :ARG0-of (w / want-01
     :ARG1 b)))
```


AMR basics – inverse roles and re-focusing



- ▶ The girl who was seen by the boy wants him.
- ▶ The boy is wanted by the girl he saw.
- ▶ The girl wanted the boy who saw her.

(w / want-01

:ARG0 (g / girl

:ARG1-of (s / see-01

:ARG0 (b / boy)))

:ARG1 b)

AMR (v1.2) relations

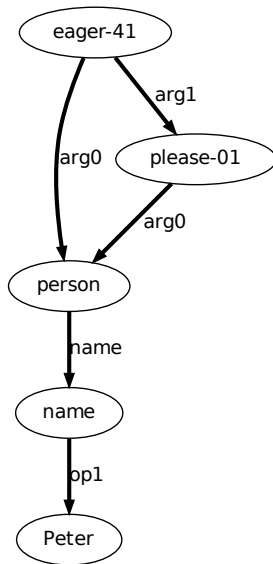
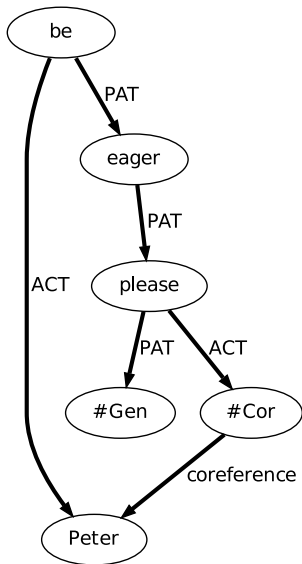
- Core** :ARG0, :ARG1, :ARG2, :ARG3, :ARG4, :ARG5 (OntoNotes)
- Coord** :op1, :op2, :op3, :op4, ...
- Date** :calendar, :century, :day, :dayperiod, :decade, :era, :month, :quarter, :season, :timezone, :weekday, :year, :year2
- Other** :accompanier, :age, :beneficiary, :compared-to, :concession, :condition, :consist-of, :degree, :destination, :direction, :domain, :duration, :example, :extent, :frequency, :instrument, :location, :manner, :medium, :mod, :mode, :name, :ord, :part, :path, :polarity, :poss, :purpose, :quant, :scale, :source, :subevent, :time, :topic, :unit, :value

For details see <http://amr.isi.edu/> and AMR guidelines.

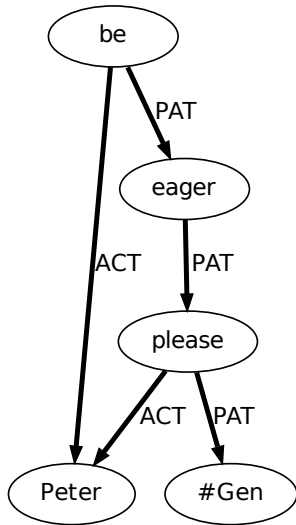
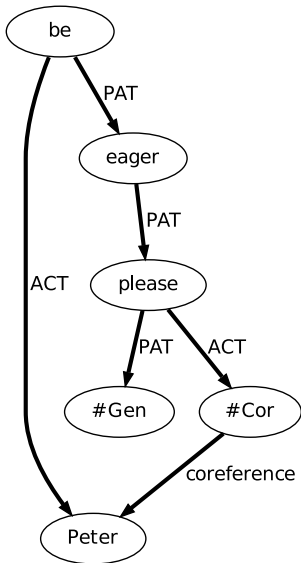
What's done

- ▶ 100 Czech sentences manually annotated with AMR
- ▶ Treex support (Read: : Amr, TrEd visualization of t-amr layer)
- ▶ Tecto-to-AMR transformation using PML-TQ
- ▶ Tecto-to-AMR transformation using Tsurgeon
- ▶ NameTag trained for English (by Milan Straka, on BBN)
- ▶ feedback for Martha Palmer (light verb constructions)
- ▶ complex predications list (*give blessing* → *bless*)
- ▶ verbalization list
(*beekeeper* → person :ARG0-of keep-01 :ARG1 bee)
- ▶ ...

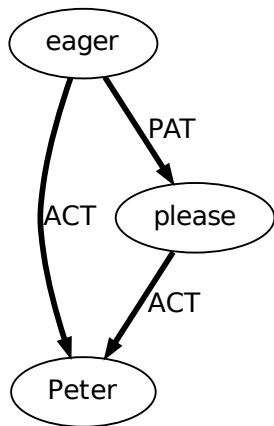
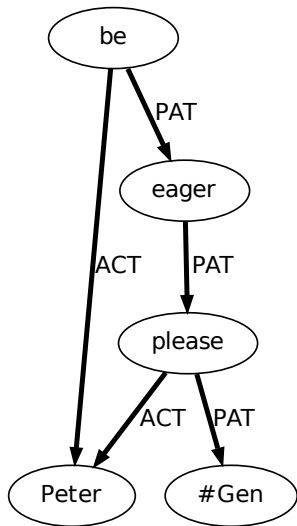
Tecto-to-AMR: "Peter is eager to please"



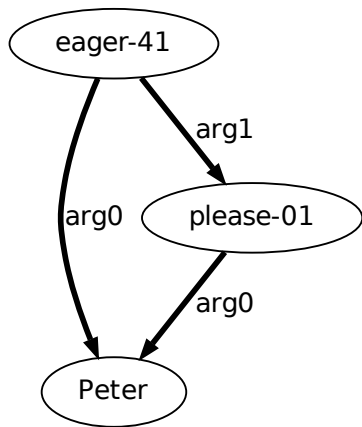
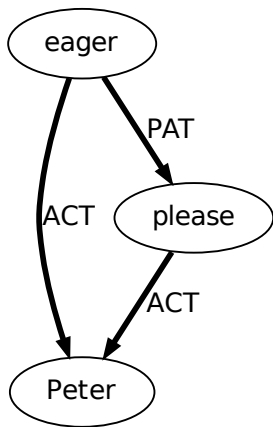
Tecto-to-AMR: 1. Merging of Coreferent Nodes



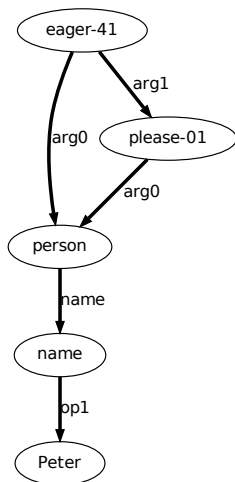
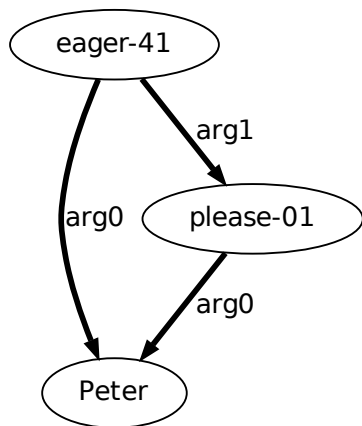
Tecto-to-AMR: 2. Elimination of semantically light words



Tecto-to-AMR: 3. Semantic Roles and Senses



Tecto-to-AMR: 4. Add Named Entities

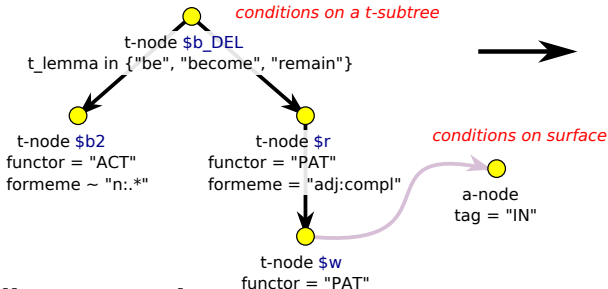


PML-TQ rules

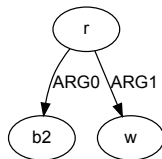
- ▶ Based on AMR guidelines (generalized)
- ▶ For copula, attributes, non-core roles . . .
- ▶ PML-TQ is for querying, not for transformation

A PML-TQ rule

LHS (PML-TQ Query)



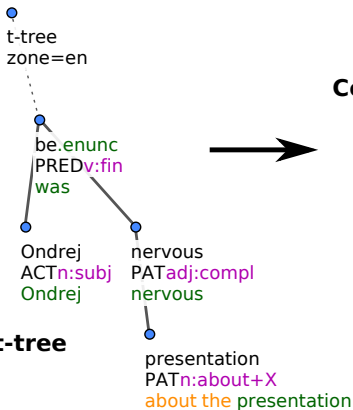
RHS (AMR Subtree)



Guidelines example:

The boy is responsible for the work.

Rule application

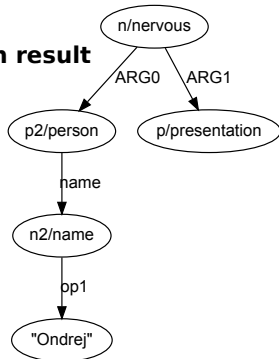


Matching t-tree

Matching sentence:

Ondrej was nervous about the presentation.

Conversion result



Results of EN t-to-AMR Conv

	<i>Semantic Role Mapping</i>	<i>Named Entities</i>	<i>Verbalization Lists</i>	<i>Smatch</i>	<i>Smatch w/o senses</i>
Baseline (direct conversion)				20	28
Baseline (direct conversion)	X			33	41
Baseline (direct conversion)	X	X		37	45
Baseline (direct conversion)	X	X	X	40	48
PML-TQ (guidelines-based)	X		X	35	43
PML-TQ (guidelines-based)	X	X	X	38	47
Tsurgeon (rule-based)	X	X	X	44	52
JAMR (text-to-AMR parser)				44	45



LA RISE

Edward
son of Edu

contrast

possible

include

say

only

person

largo-of

dream

SOL

you



You may say I'm a dreamer,
but I'm not the only one.

