Outline for today

• Megamodelling and megamodels
  • quick intro and classification

• NGA: Node—Graph—Automaton
  • the main claimed contribution

• Case studies
  • application
The simplest megamodel
Mega-I: modelling model systems

- focus on the abstract aspect
- megamodels are models which elements represent other models
Mega-I: modelling model systems

V. Zaytsev, *Language Convergence Infrastructure*, GTTSE’09, LNCS 6491, 2011
Mega-II: modelling MDE

- model of main model-driven concepts
- a domain model for the domain of modelling
- megamodel elements are concepts, not artefacts
Mega-II: modelling MDE

V. Zaytsev, A.H. Bagge, *Parsing in a Broad Sense*, MoDELS’14, LNCS 8767, 2014
Mega-III: resolvable megamodels

- statements are made about concrete entities
- entities are linked to artefacts
Mega-III: resolvable megamodels

Back to the simplest megamodel
NGA

• Node
  • a named dot
  • pluggable into bigger megamodels

• Graph
  • its internal structure
  • a megamodel with nodes-models
  • syntax

• Automaton
  • what happens with execution
  • semantics
  • behaviour
E1: Data Synchronisation

\[ L \Leftrightarrow S \]

\[
\begin{align*}
[(1924, \text{Büchi}),] & \Leftrightarrow \{(1925, \text{Moore, Madison}), \\
(1925, \text{Moore}), & \quad (1927, \text{Mealy, Harward}), \\
(1927, \text{Mealy})] & \quad (1924, \text{Büchi, ETH})
\end{align*}
\]
E2: Software Migration

\[ S_1 \xrightarrow{\tau} S_2 \]
E3: Parsing

\[ S \rightarrow T \]

Parse tree:

```
G
```

- `2 + 3 * 4`

- `2`
- `3`
- `4`
- `+`
- `*`

The parse tree represents the expression `2 + 3 * 4`.
E4: Cotransformation

\[
\begin{array}{c}
G \xrightarrow{\iota} \tau \xrightarrow{\omega} G' \\
\downarrow \chi \quad \quad \quad \downarrow \sigma \\
P \xrightarrow{\iota} \tau' \xrightarrow{\omega} P'
\end{array}
\]
Concluding remarks

• useful
• powerful
• expressive
• underresearched

TO DO
• figure out how to “zoom in” A-views
• formalise N to G refinement
• N-A models