PLT Redex:
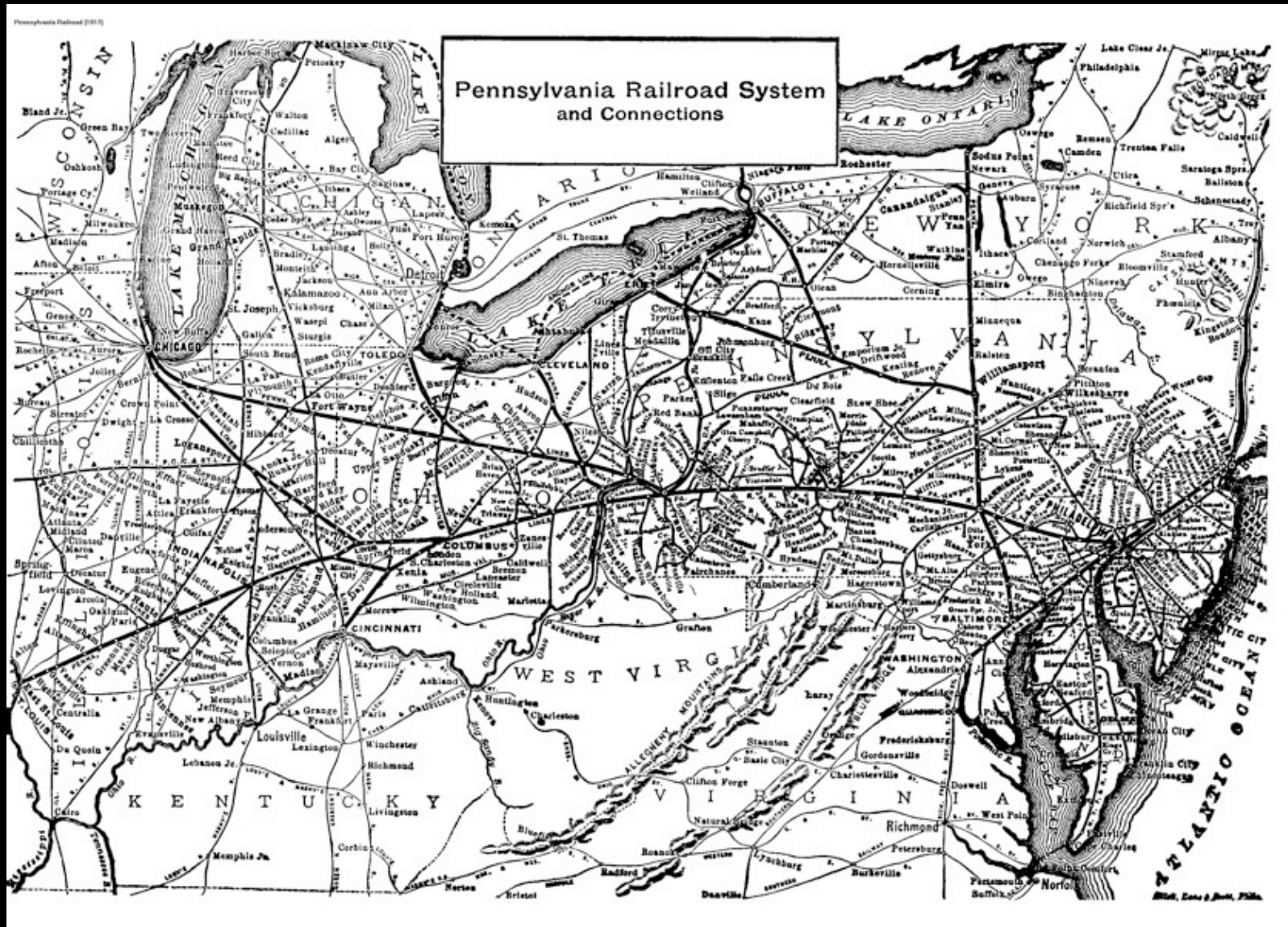
a semantics engineer's toolkit

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Critical Infrastructure

Pennsylvania Railroad System and Connections

Heavy-duty Tools

Simpler Jobs

Mismatched Tools

The Right Tool for the Job

Sometimes, Overhead Matters

Isabelle, HOL,
Coq, Twelf, ...

PLT Redex

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EDSL

`define-language`

`reduction-relation`

`define-metafunction`

Tools

`traces, stepper`

typesetting

test suites

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```
(define-language lang
  (e (e e ...)
     x
     v)
  (v number
     (λ (x ...) e)
     +
     *)
  (x (variable-except λ + *))
  (E hole
     (v ... E e ...)))
```

Target, ii

```
(define red
  (reduction-relation
   lang
   (--> (in-hole E (+ number ...))
        (in-hole E ,(apply + (term (number ...)))))
        +)
   (--> (in-hole E (* number ...))
        (in-hole E ,(apply * (term (number ...)))))
        *)
   (--> (in-hole E ((λ (x ...) e) v ...))
        (in-hole E (subst-n ((x v) ... e)))
        λv)))
```

Executable

```
(traces lang
        red
        (term (((λ (x) (x x))
                (λ (x) (x x)))
              (* (+ 1 2)
                 (+ 3 4)))))
```

For fun

```
(define-language lang2
  (e (e e ...)
     x
     v)
  (v number
     (λ (x ...) e)
     +
     *)
  (x (variable-except λ + *))
  (E hole
     (e ... E e ...)))
```

For fun

```
(traces lang2
        red2
        (term (((λ (x) (x x))
                (λ (x) (x x)))
               (* (+ 1 2)
                  (+ 3 4)))))
```

http://www.cs.uchicago.edu/~robby/plt-redex/