Improving the Reuse of Language Infrastructures

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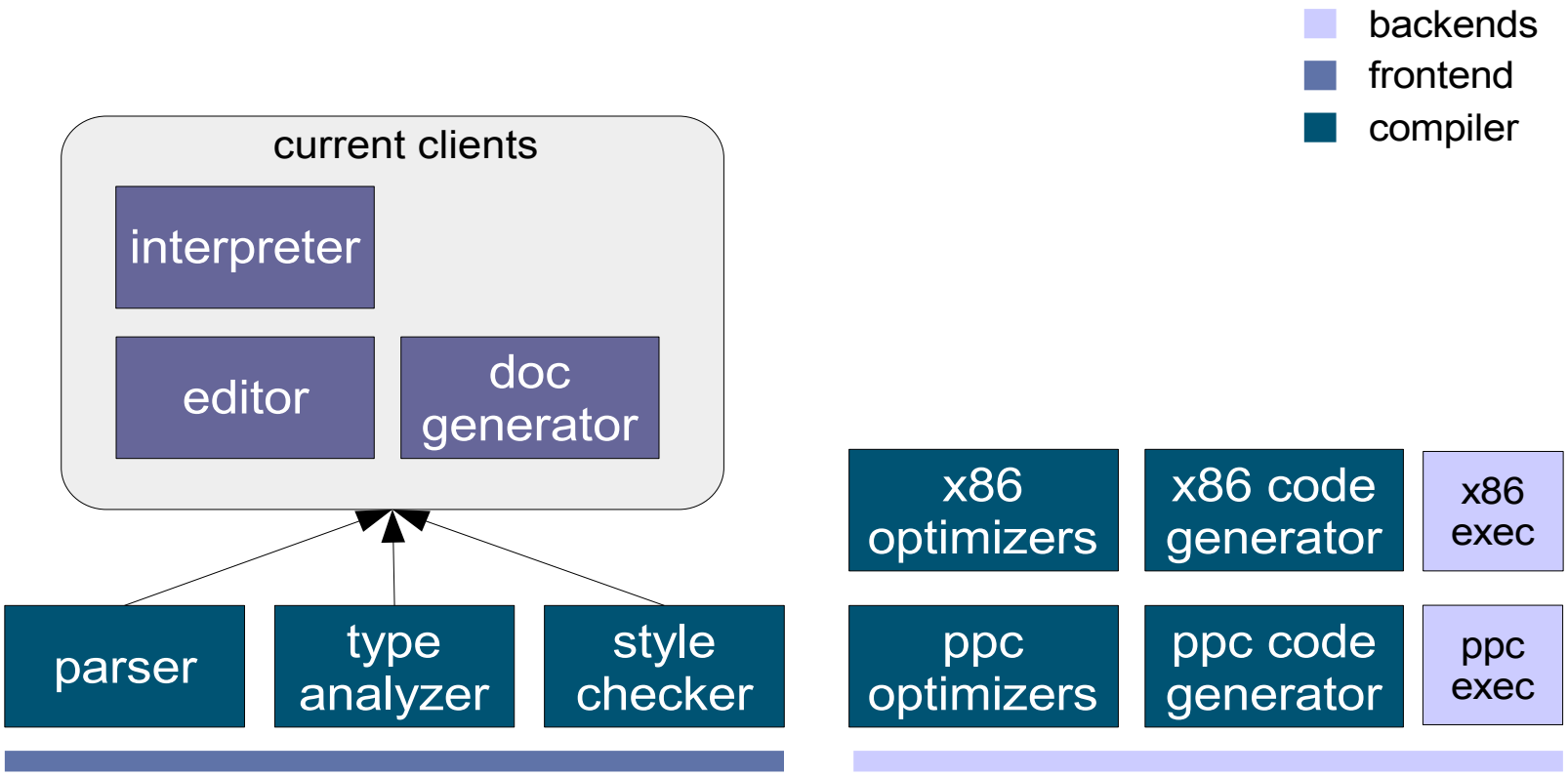
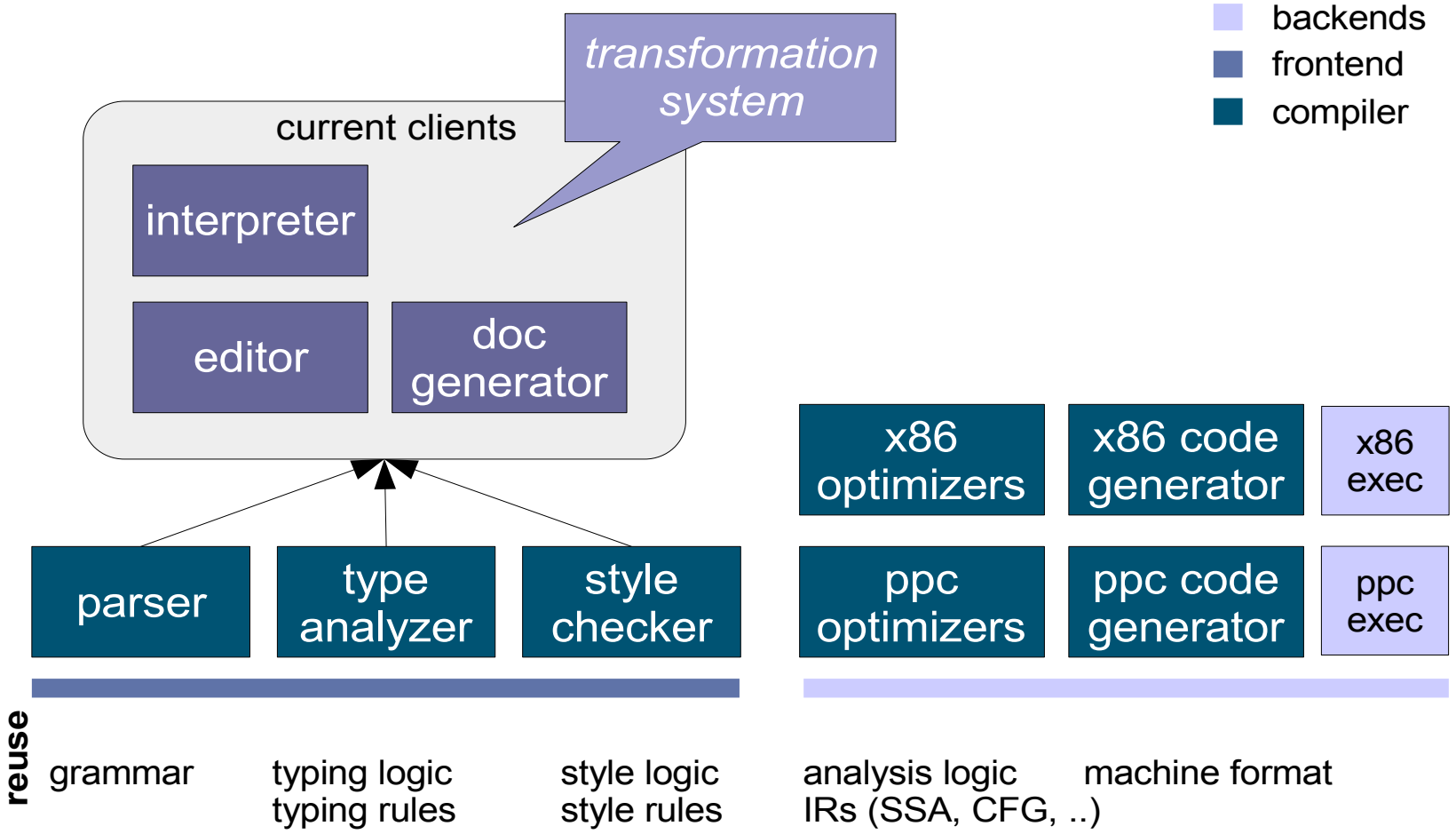
Motivation

- People build language infrastructures all the time
  - compilers, language-specific transformation systems, code analyzers and generators
- Reusing these is surprisingly difficult
  - very few compilers/analyzers are open and extensible
  - limited plug-in capabilities
- Consequences
  - language processing is difficult for most developers
  - light-weight, text-based scripts are preferred
  - new infrastructures mostly built from scratch
  - these systems are frequently brittle and incomplete
  - *programmable transformation systems seldom used*

Language Infrastructure



Language Infrastructure



Us and Them and The Other Guys

- Us = the software transformation community
  - rewriting of source code and other software artifacts
  - language infrastructure is a means to an end
  - obvious *reusers* of mainstream language infrastructure
  - some degree of community interoperability and reuse
- Them = language providers
  - providers (and *maintainers*!) of language infrastructure
  - mostly closed solutions; no extensibility
  - design goals do not include code rewriting
- The Other Guys = library/framework developers
  - potential users of programmable transformation systems

Why is Reuse so Poor?

- Technical barriers
  - not designed for reuse (no documentation, no libraries)
  - no de facto standards for interoperability
  - poorly compatible implementation languages
  - (incompatible licenses)
- Sociological barriers
  - lack of awareness
  - no project support infrastructure (issue tracker, forums)
  - misconception that “parsing is enough”
  - “not invented here”-syndrome

Some Suggestions

- Technical
  - data integration
    - serialize ASTs (UPTR)
    - experiment with more general interchange formats
  - functional integration
    - co-develop sensible compiler rewriting APIs
- Sociological
  - promote existing language infrastructures
    - place prominently on `pt.org`
  - combat “not invented here syndome” – collaborate!
  - point to, and document, success stories
  - promote killer feature: adaptable domain-support

Conclusion

- Current status: “Have solution, need problem”
  - at least, “have product, want clients”
- Promotion and advocacy is necessary
  - examples, documentation, hyperiding
- Open-sourcing improves code reuse
  - potentially high maintenance cost
- Complete openness not required
  - exposing a stable AST interface is already useful
- Tendency towards opening mainstream compilers
  - ECJ DOM, JSR 269 (APT), JSR 199 (compiler API)