Hello my name is Petros and I’m a declaraholic

NetDB 2009

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Searching and Fearless Inventory

• Member of the P2 group since its beginning
• Dubious distinction of having been the world’s foremost OverLog expert for a few years
• Lots of exciting declarativeness: networking, overlays, classic algorithms, BFT systems
• Proof of concept deliriously successful: systems can be distributed views!
Admit Nature of Wrongs

• First-system syndrome: unintuitive semantics
  – State updates non atomic, not ordered, etc.
  – Soft-state across nodes muddy at best
  – Soft & hard state: multiple intuitive meanings

  – Fix: find actual semantics and publish it!
  – High ground of ostentatious correctness

• Programming intuitiveness more important than heroic semantic prowess
Make Direct Amends

• Sorry!

• Help with features that no programmer enjoys
  – Messaging, data rendezvous, security, privacy

• In environments where optimization is tedious
  – Non-uniform networks, computation, trust, policy

Evolve steadily and let the mores catch up
Carry the Message to Addicts

**MOMMIE:** Middleware for Optimized mMessaging in Insecure Environments

Enough declarativity to bring distributed algorithmic designs to life efficiently
Carry the Message to Addicts

- Traditional, even imperative (GASP!) computation but abstracted coordination
  - Event-driven, with guards declared as conditions on ephemeral object graphs
    - Data types, content, authentication, confidentiality, privacy
  - Data model monotonic without negation
  - Not about application state, but about immutable "messaging" data

- Transitions are black-box, with side-effects
  - Implemented in C++, python, Erlang, Basic, punch cards
  - If computation formal (e.g., in +Cal), can compose proof with coordination!

- Runtime provides componentized implementation of semantics
  - Crypto for security/privacy, Transports, Caching discipline, Garbage collection
  - Safe transformations thereof: batching, amortization, refinement, escalation
  - Optimize choice using deployment characteristics, measured and configured