

Governing IT

Organizations Meet Services

Munindar P. Singh

`singh@ncsu.edu`

Department of Computer Science
North Carolina State University
<http://www.csc.ncsu.edu/faculty/mpsingh/>

Services in IT

- Services facilitate the development of IT applications
 - Services capture reusable, composable functionalities
- Services facilitate the deployment and management of IT applications
 - Well-defined components, easier to monitor and reconfigure
 - Enable closer fine tuning with respect to key performance indicators

Today's services

- Solve yesterday's IT problems
- Simple computational entities
 - Like objects to be invoked
 - Not like business services
- Do not support complex, cross-enterprise, collaborative business processes

What is common across ...

- Human service engagements
- Interoperating “peer” telcos
- Large-scale computing infrastructures
- Resource sharing at the micro level

Is the need for autonomous parties to work together

Governance versus management

- Management: by superiors of subordinates
 - Control over managed resources
 - This is what today's services help realize
- Governance: by autonomous equals of themselves
 - Collaborative decision-making among stakeholders
 - Process of decision-making, not specific outcome

Why is governance important?

- Emerging computing scenarios often involve collaboration among autonomous parties
 - Share resources in a controlled manner
 - Configure and reconfigure
 - Enable unanticipated uses for resources
 - Administer respecting human organizational needs
- Currently, governance is manual

Why is governance difficult?

Herding cats

- *Autonomy*: Members behave independently, constrained only by their agreements
- *Heterogeneity*: Members are independently constructed, constrained only by interface descriptions
- *Membership dynamism*: Configuration changes at runtime
- *Structural dynamism*: Members exhibit complex, evolving relationships

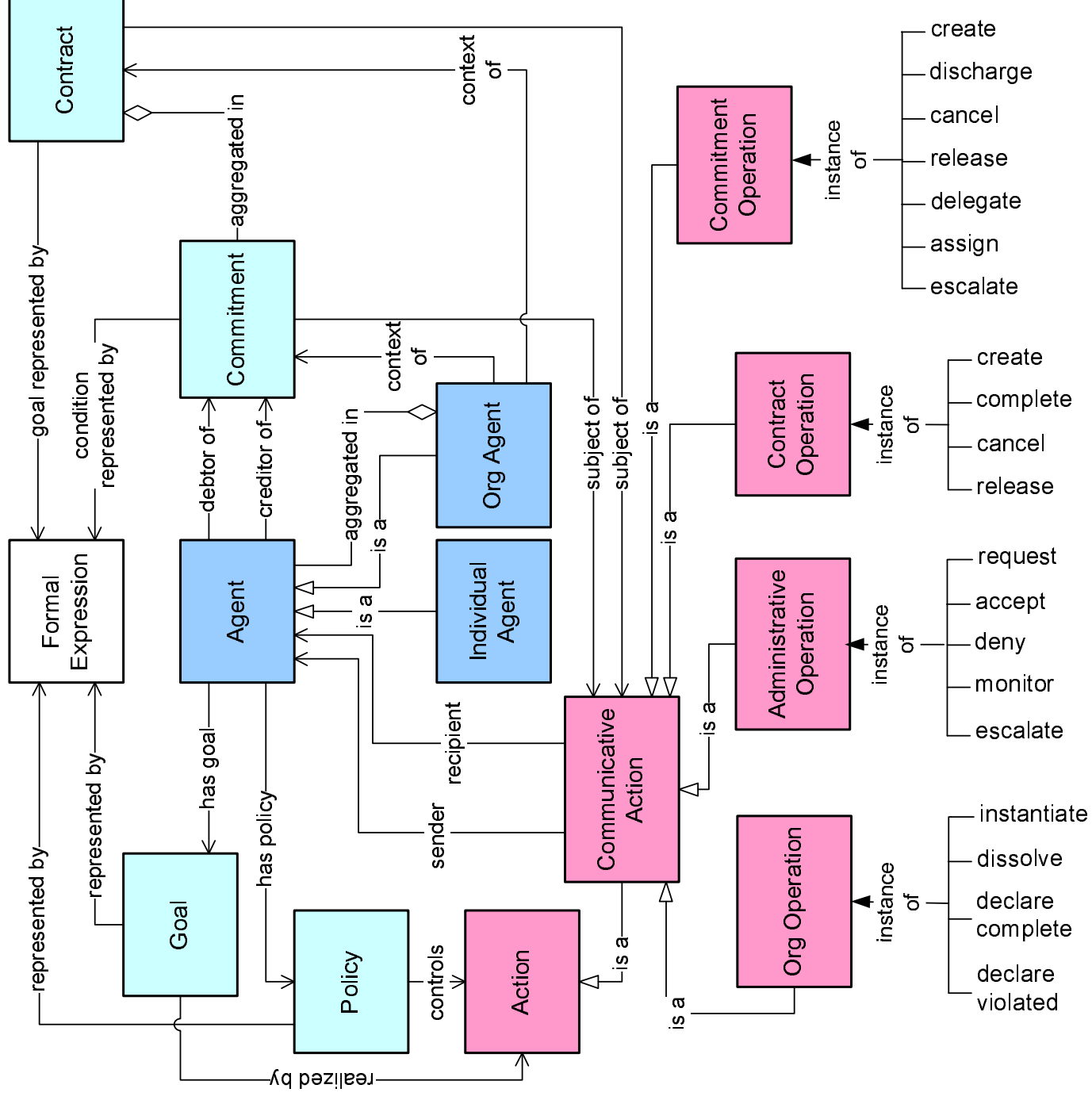
Achieving governance: Agents

How can we govern IT resources?

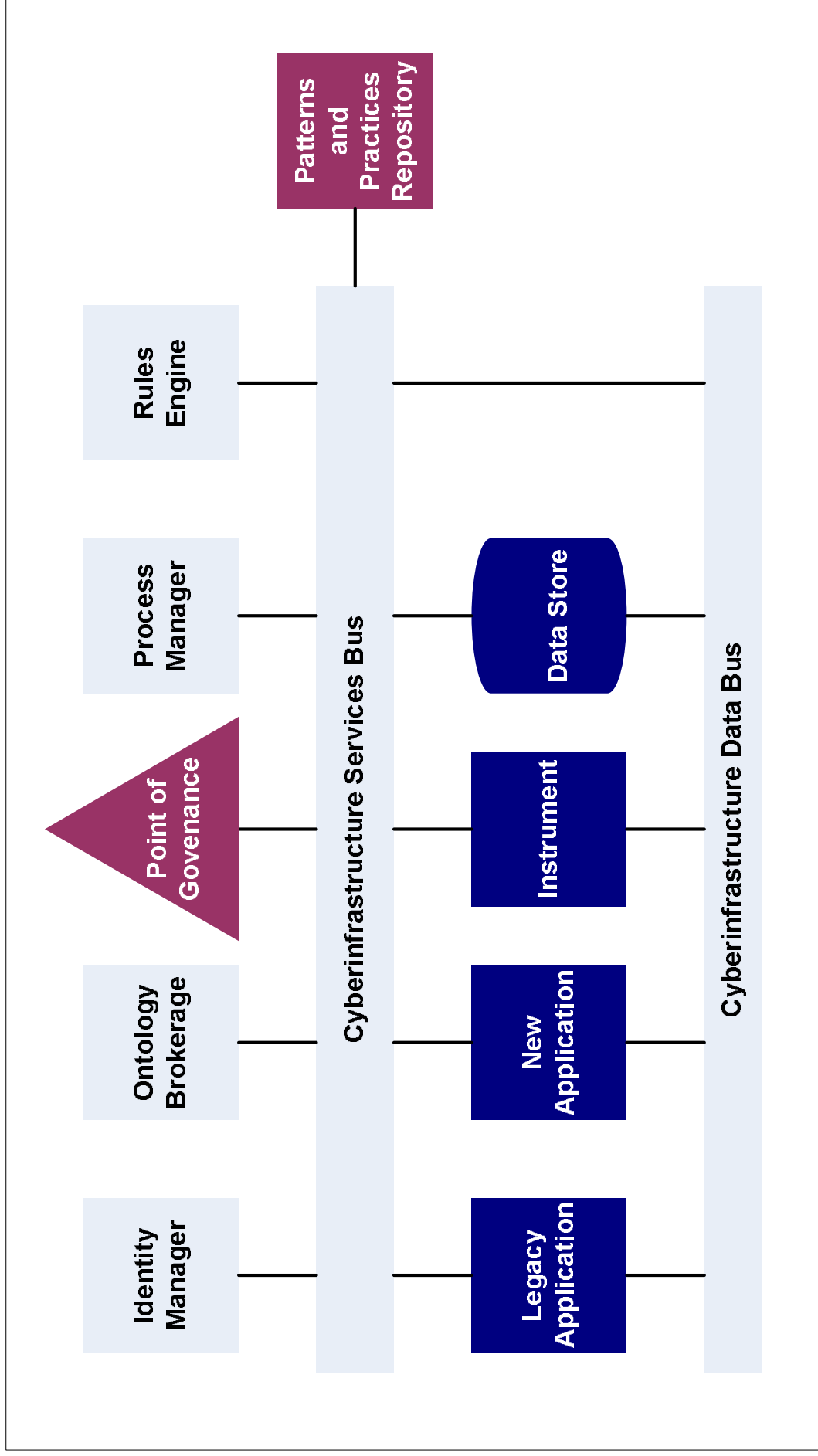
- Model IT resources as services
- Model stakeholders as agents
- An agent manages services within its purview
- Think of business service engagements rather than object-like services
- Formulate and apply policies that respect stakeholders

Achieving governance: Policies

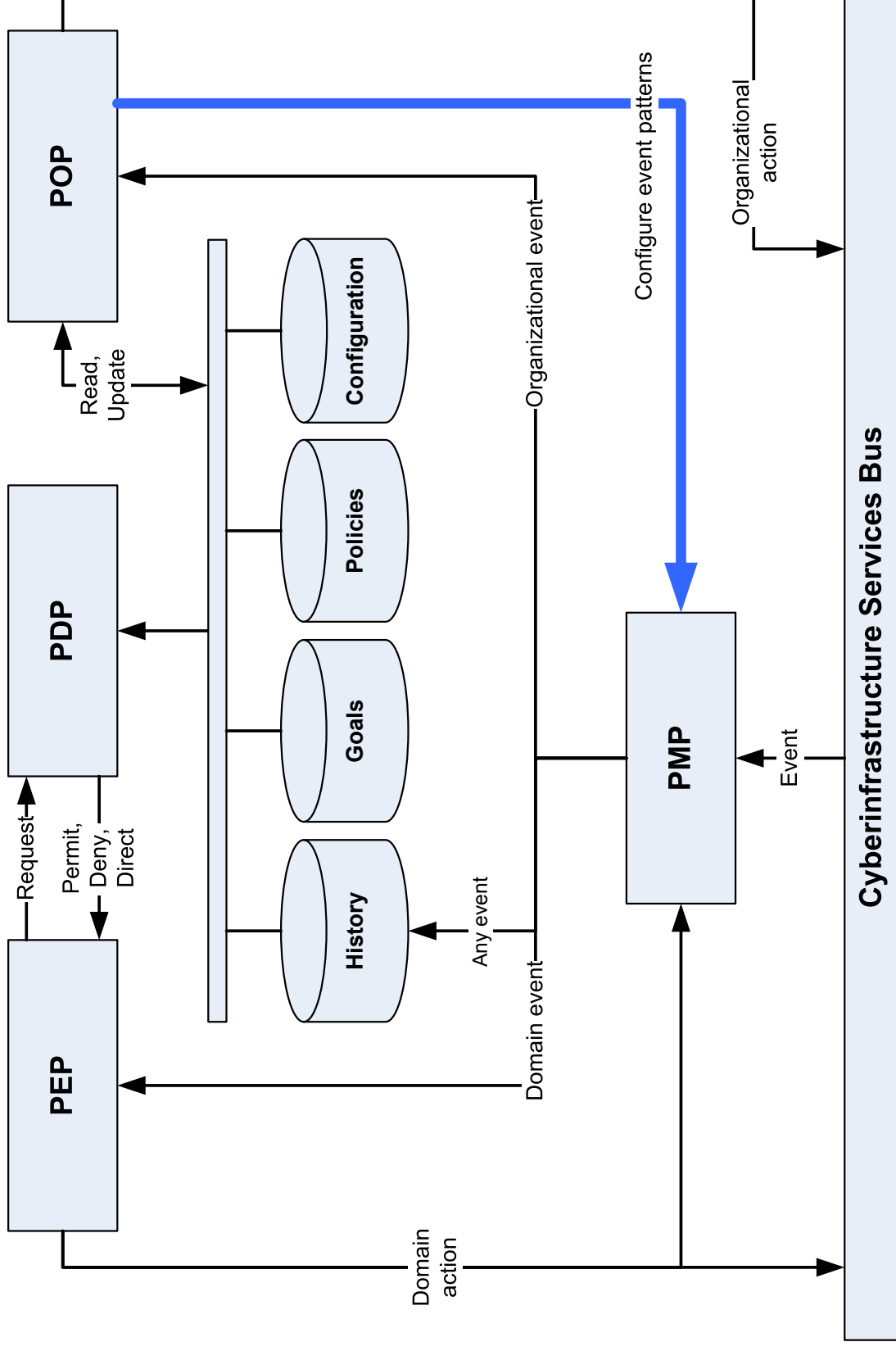
- Most policy research is on languages and engines
- Diminishing returns polishing such research
- (And it doesn't work as well in practice)
- Need policy models for governance, not just management
 - Vocabulary and conceptual model
 - Architecture for monitoring, compliance checking, and enactment
 - Operational semantics
 - Design patterns



System architecture

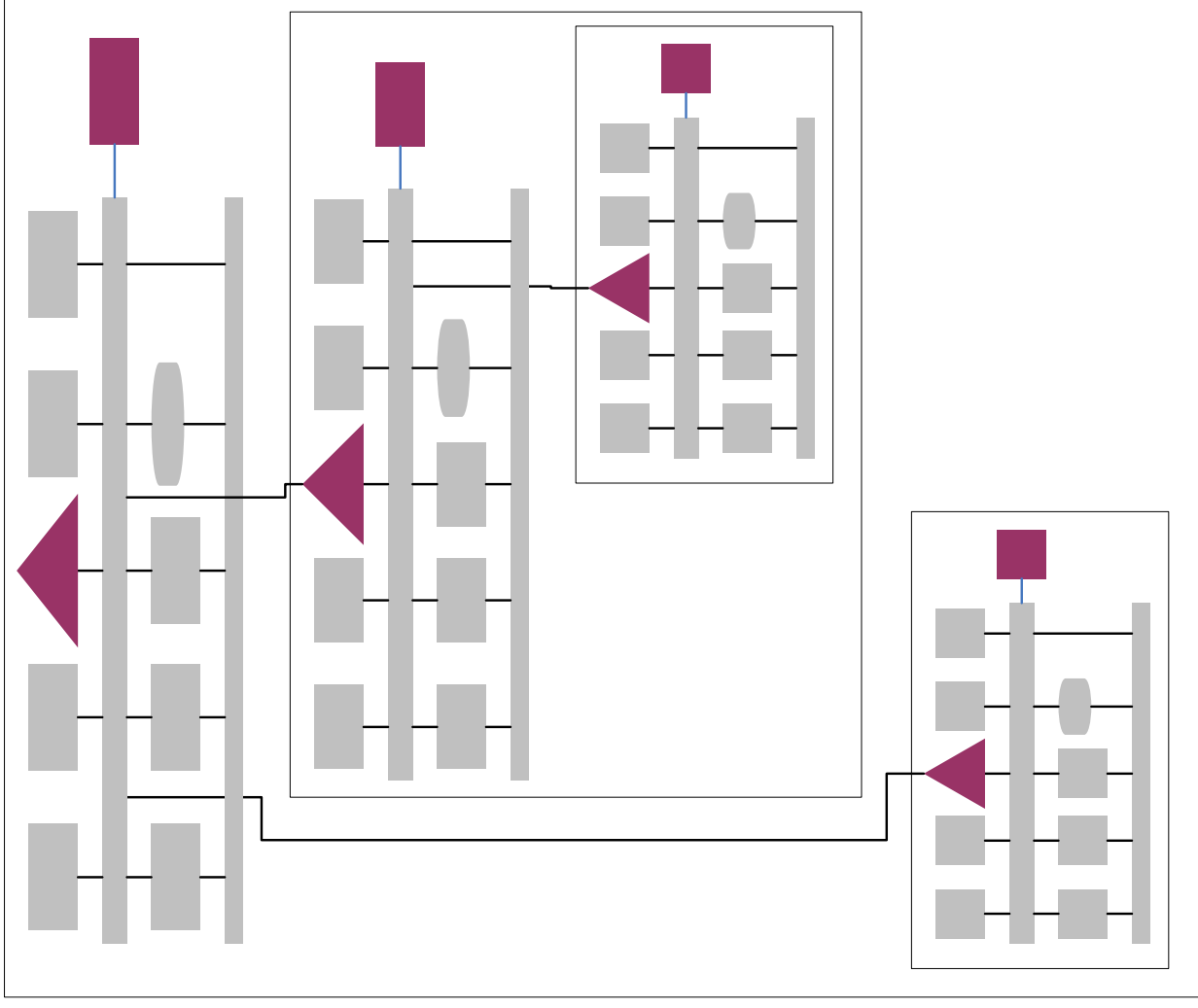


Point of governance

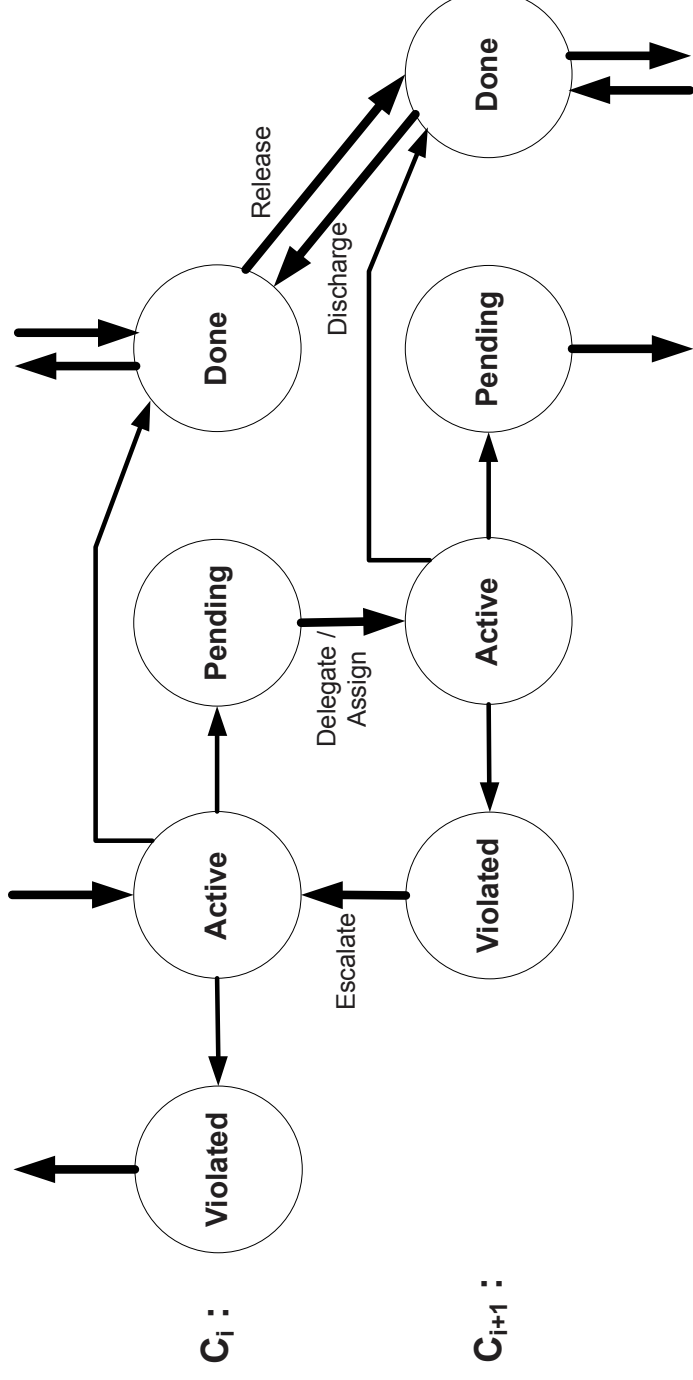


Fractal structure

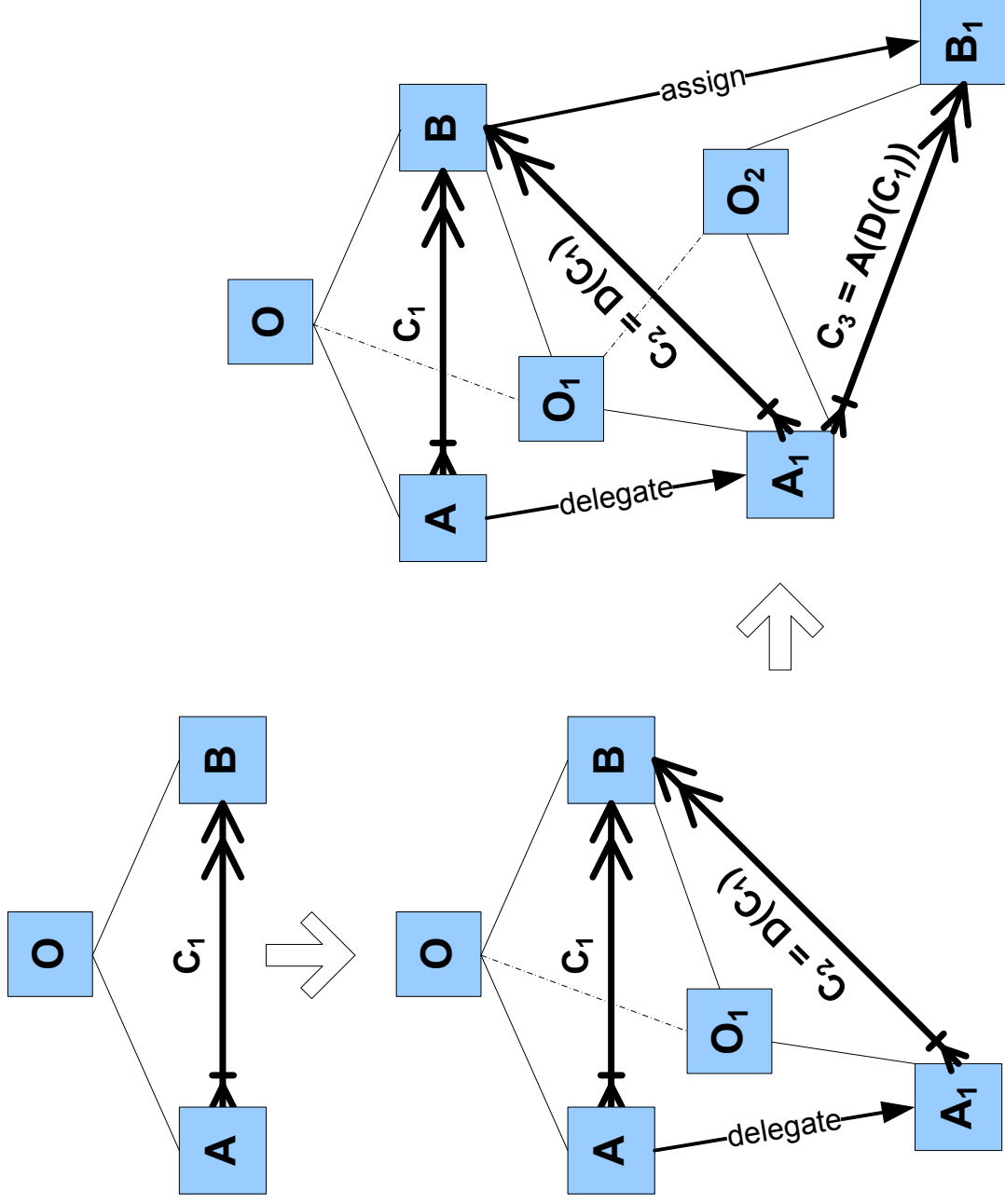
- Orgs within Orgs
- It's turtles all the way!



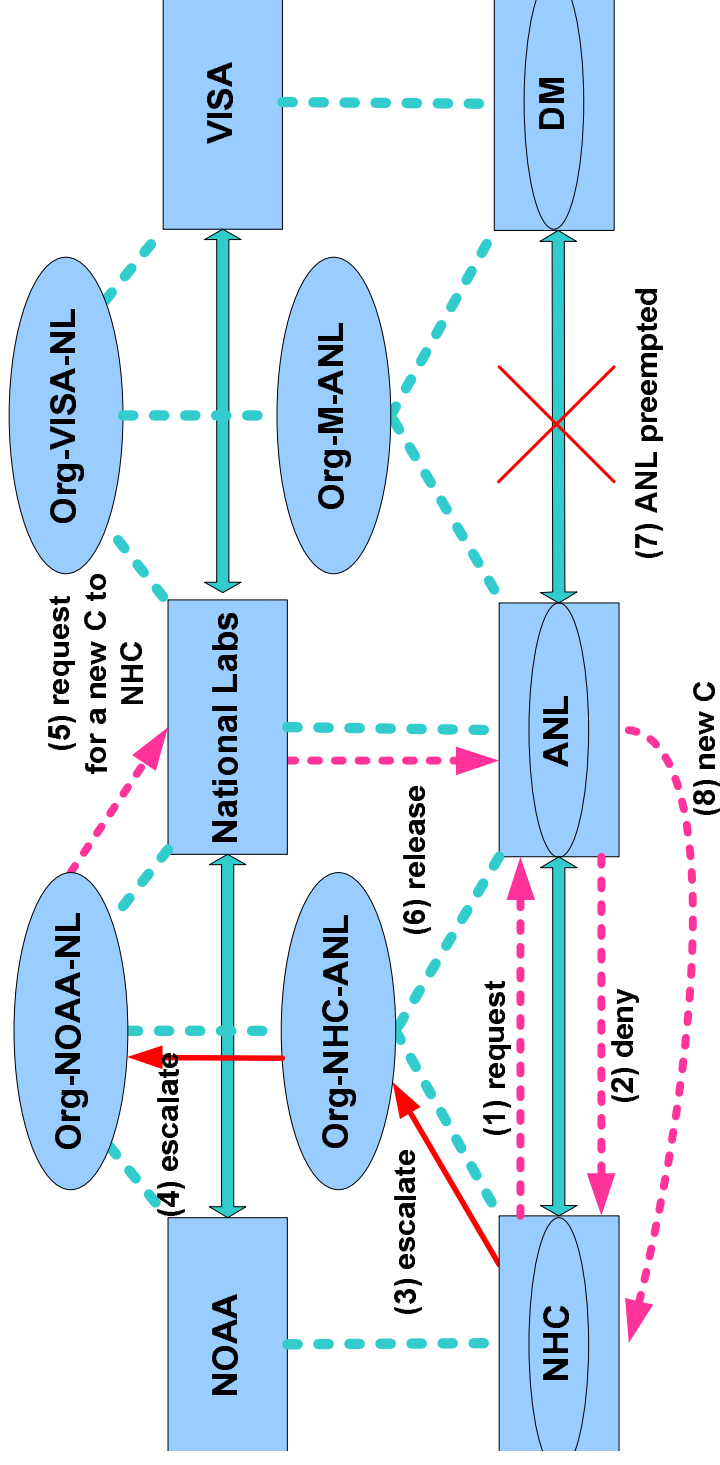
Operational model: coarse



Operational model: fine



Computing preemption



Research directions

- Study the dynamics of contracts
- Enhance vocabulary to simplify capturing realistic scenarios
- Develop design patterns for Orgs and policies
- Study policy stratification to accommodate policies across Orgs

Summary

- Interaction as first class citizen
- Protocols versus policies
- Semantics enables
 - Refinement
 - Composition
 - Contextualization
- Subtle notions of correctness: conformance, interoperability

Thanks!

<http://www.csc.ncsu.edu/faculty/mpsingh/>

Norms, policies, commitments

- Norms: general, community-based, not enforced by a single agent
- Policies: of an agent, not of a society (but can model an organization as an agent)
- Commitments: among agents
- Consequences of the above
 - Norms aren't policies
 - Norms and policies aren't commitments

Institutions

- Institutions are organizations that have an identity distinct from their members
 - Long-lived organizations
 - Enforce behavioral constraints on members
- An organization corresponding to a particular contract makes sense, but an institution doesn't