Back to the Future

P2P Computing and Service-Oriented Architectures

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Conclusions

- P2P computing and SOA each have a
  - Great vision and motivation
  - Disappointing realization
- Reason: they gave up their core motivation
- When you understand them correctly, each is valuable and complements the other
  - And their combination is necessary for modern IT

P2P computing: 1

Autonomous parties interacting as equals

- Initially file sharing
- More general P2P applications
- Need structure
  - Often impose it via super peers
    - Super over whom?
    - Super based on what?
  - Consider emergence of authorities

P2P computing: 2

- Work on DHTs and such “closed” techniques
  - Fights a losing battle against centralized approaches
  - Tries to win on criteria such as performance, reliability, . . .
  - But not on autonomy or difference of opinion

Peers are equal but their autonomy is compromised

Service-oriented architecture: 1

To support autonomous service ecosystems and value networks

- Web services are objects wrapped in XML
  - Master-slave orientation
  - Even conversations are specified from the provider's perspective
  - The situation improves with choreographies
  - Rigid behaviors
  - Registries are central

Service-oriented architecture: 2

- Quite the opposite of P2P computing
- Service provider and consumer are complementary roles
- Does not support complex, cross-enterprise, collaborative business processes

Service providers and consumers are potentially autonomous but not quite equal

Hope for SOA

- Think of services, not objects
- Services as in *business services*
  - Not requests and responses, or even messages
  - Instead *engage*
- Fundamentally symmetric
  - Different tasks performed by each party
  - Different interactions, e.g., for payment

Business services

Resemble human interactions

- Multiple parties
- Each party potentially active
- Long-lived interactions
- Face exceptions

Adding structure

- The participants in business service engagements are often organizations
- Org structure helps govern service engagements
- Like super peers, but not “super” in an arbitrary way
  - Not super based on capacity, but on capabilities, authority, power, . . .

Institutions

Institutions are organizations that have an identity distinct from their members

- Long-lived organizations
- Provide a locus for credentialing
- Enforce behavioral constraints on members
- Their main hold over their members is the membership itself

What is common across . . .

- Human service engagements
- Interoperating “peer” telcos
- Large-scale computing infrastructures
- Resource sharing in general

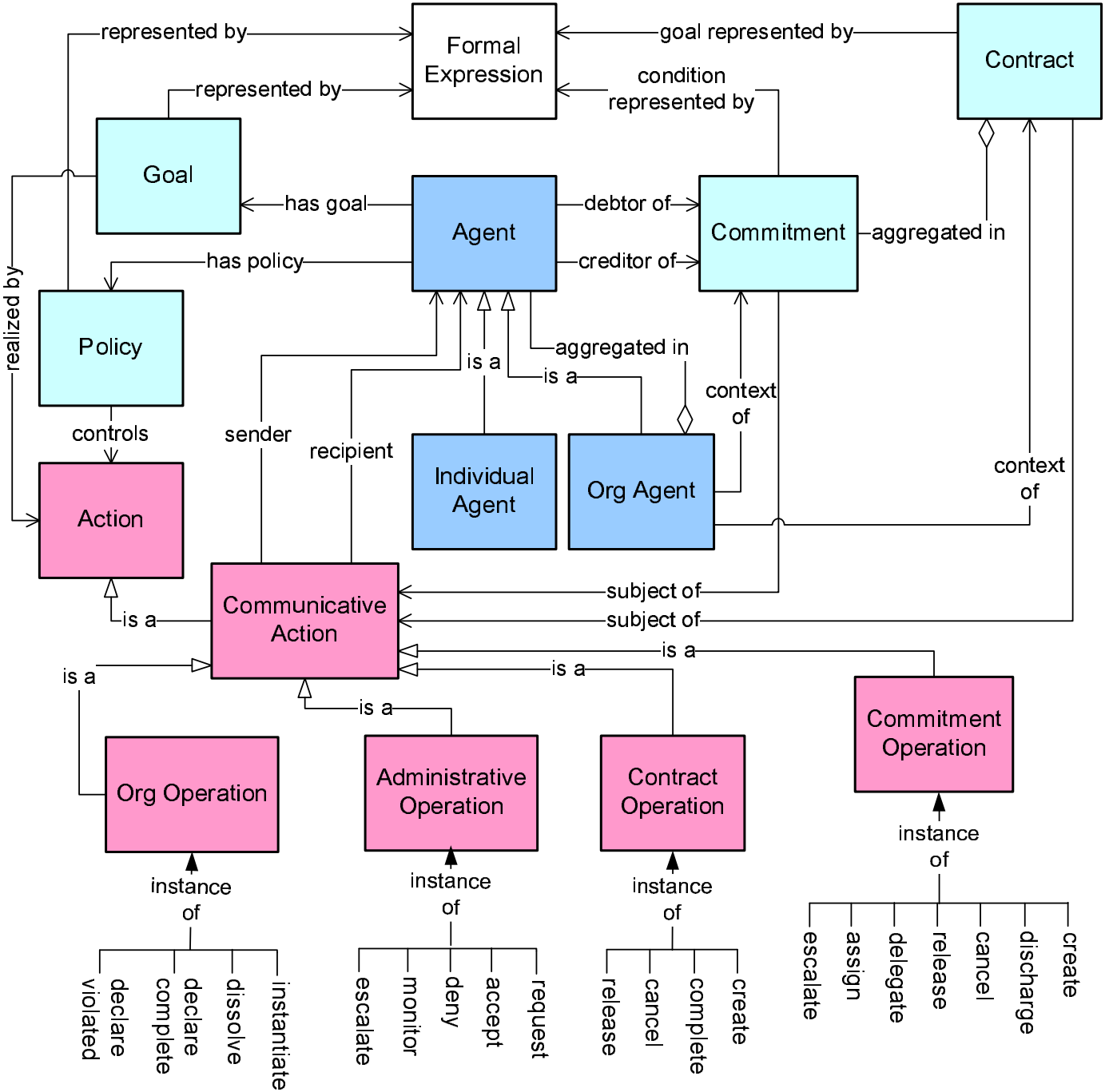
Is the need for autonomous parties to work together as equals in spirit

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
  - How policies are created and applied

Higher-level abstractions

- To design the peers to interact properly, introduce richer abstractions
  - Commitments and contracts
  - Authority and power
  - Norms and policies
  - Trust
  - . . .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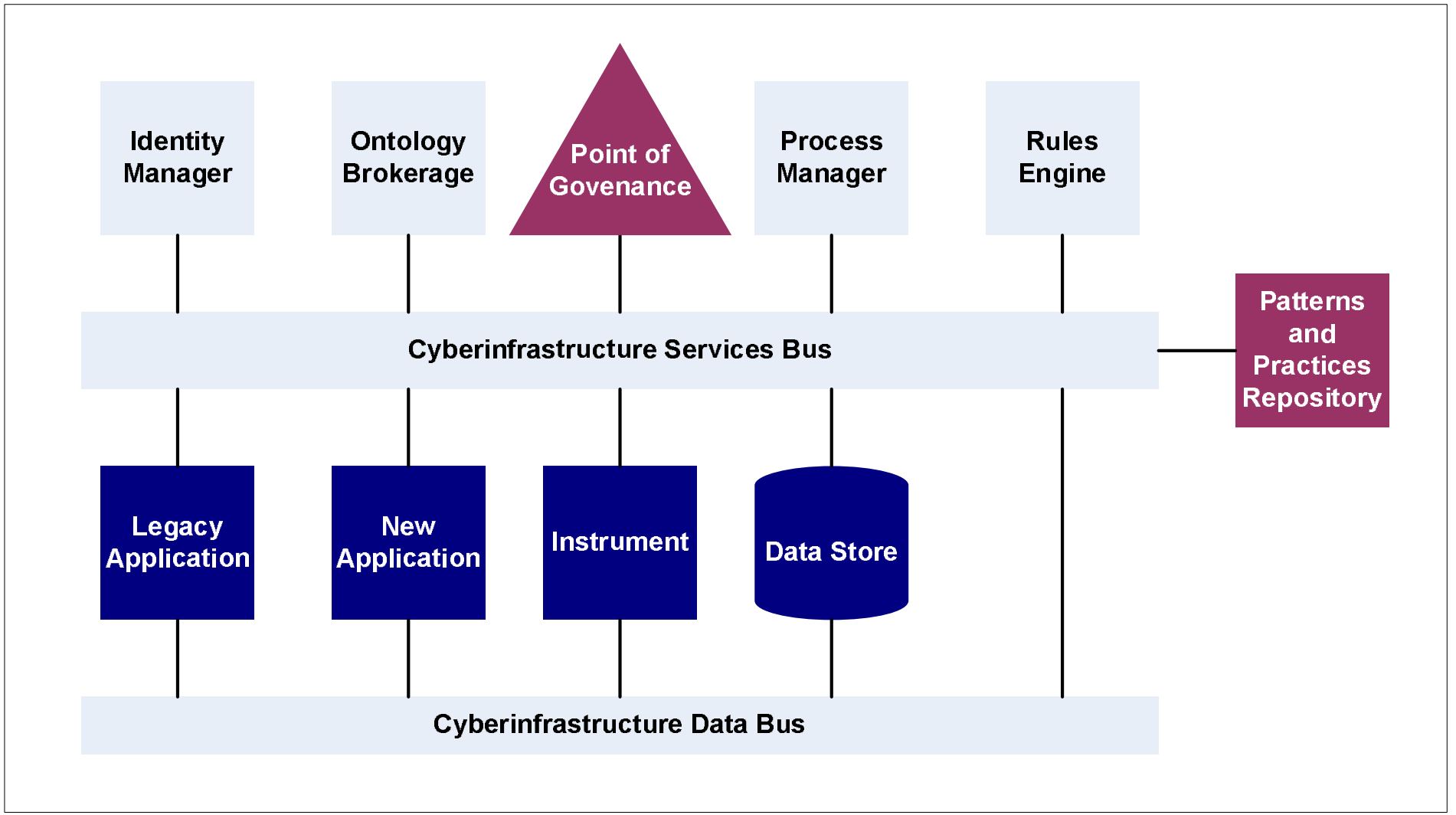
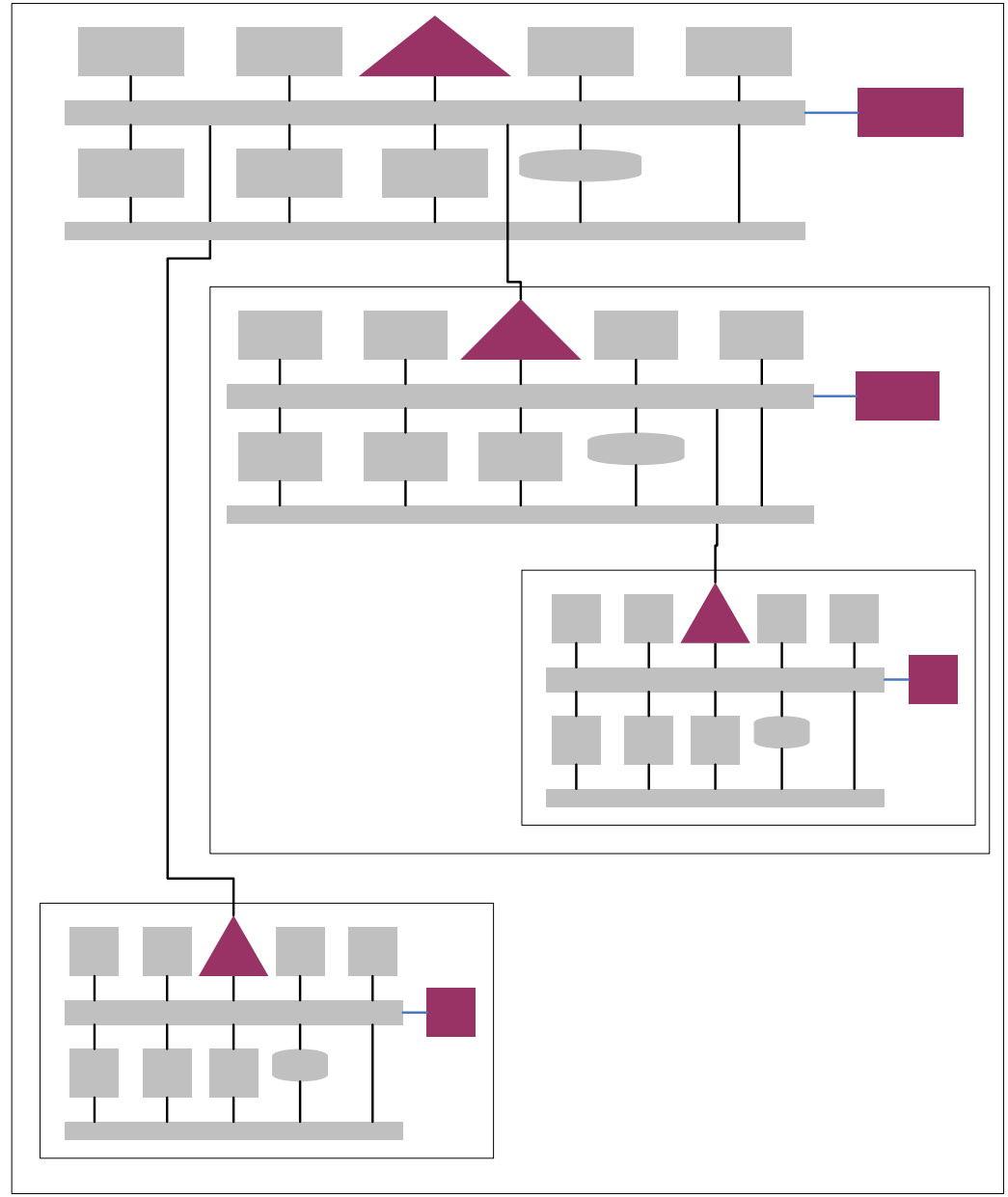
System architecture



Fractal structure

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



Summary

Business-service oriented architecture

- Conceptually peer to peer
- Unlike traditional SOA
- Unlike traditional P2P

The participants are autonomous and equal

Thanks!

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