Abstract:

Because it takes time and trust to establish agreement, traditional consensus-based architectural styles cannot safely accommodate resources that change faster than it takes to transmit notification of that change, nor resources that must be shared across independent agencies.

The alternative is decentralization: permitting independent agencies to make their own decisions. Our definition contrasts with that of distribution, in which several agents share control of a single decision. Ultimately, the physical limits of network latency and the social limits of independent agency call for solutions that can accommodate multiple values for the same variable.

Our approach to this challenge is architectural: proposing constraints on the configuration of components and connectors to induce particular desired properties of the whole application. Specifically, we present, implement, and evaluate variations of the World Wide Web’s Representational State Transfer (REST) architectural style that support distributed and decentralized systems.