A Collective Approach to Harness Idle Resources

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Abstract

We propose a collective approach for harnessing the idle resources (cpu, storage, and bandwidth) of nodes (e.g., home desktops) distributed across the Internet. Instead of a purely peer-to-peer (P2P) approach, we organize participating nodes to act collectively using *collective managers* (CMs). Participating nodes provide idle resources to CMs, which unify these resources to run meaningful distributed services for external clients. We do not assume altruistic users or employ a barter-based incentive model; instead, participating nodes provide resources to CMs for long durations and are compensated in proportion to their contribution.

In this paper we discuss the challenges faced by collective systems, present a design that addresses these challenges, and compare it with previous approaches. We show that the collective service model is a useful alternative to the pure P2P models. It provides more effective utilization of idle resources, has a more meaningful economic model, and is better suited for building legal and commercial distributed services.