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.