

## **Collaborative Peer-to-Peer Systems**

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Resource rich computing devices, decreasing communication cost, and Web 2.0 technologies are fundamentally changing the way we communicate, socialize, and collaborate to create a better world while propelling us to the social age of societal development. Peer-to-Peer (P2P) computing naturally fits to the social age because it is user driven, distributed, utilizes resource-rich edge devices, and encourages sharing. Collaborative Adaptive Sensing of the Atmosphere (CASA) is an emerging Distributed Collaborative Adaptive Sensing (DCAS) system based on a dense network of weather radars that operate collaboratively to detect tornadoes and other hazardous atmospheric conditions. CASA requires the ability to produce data (e.g., tasking radars to scan a region in the atmosphere), gather required processing resources, push data to those processing resources, and pull the processed data to end users. Hence, peers in CASA like DCAS systems constantly push and pull data between each other's resources, and thus are fundamentally different from conventional P2P applications that only push or pull data. Alternatively, going beyond the current paradigm of peers performing similar tasks, such collaborative P2P systems will look for diverse peers that could bring in unique capabilities to the community thereby engage in greater tasks that cannot be accomplished by individual peers, yet beneficial to all the peers. We envision many other applications that could benefit from the new push and pull data transfer model, some of which includes mobile social networks, community cloud computing, GENI (Global Environment for Network Innovations), and disaster management. These collaborative P2P systems need new tools and communication platforms to connect, discover, share, and collaborate. Thus, there is a tremendous opportunity to create value by uniting a set of peers/individual for a common cause.