



RESEARCH ARTICLE

CYCLOPHENIX: Inexpensive Membership Management Protocol Supporting Resilient Low-Diameter P2P Topologies

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Abstract— Peer-to-Peer networks are usually unstructured network. An unstructured network is simply a network which does not have a specific layout. Anyone who joins it becomes an integral part of the network, and changes its topology. Anyone can walk off at any time; the network will eventually change, but without any fall out (ideally). Ideally, such networks should have a low diameter; offer a high degree of resilience against the dynamisms of nodes, nodes failure and malicious actions with a purpose of distracting the network. Whereas, a structured network are predestined networks, having predefined connectivity among the nodes, in order to put forward an assurance between the source node and the destination node. Neither the structured nor the unstructured networks can simultaneously give both good performance and resilience in the network. A gossip based membership management protocol is described here. Our protocol constructs a graph that have low diameter, low clustering, highly symmetric node degrees, that are highly resilient to massive node failures and robust to network dynamics such as joining/leaving of nodes, node failures and large scale network attacks.

Indexed Terms: - Peer-to-Peer network, Membership Management, Gossiping Protocol, Unstructured Network, Random Graphs, Resilient Networks.

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