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Gallager-Spira-Humblet Minimum Spanning Tree Algorithm and Lamport-Shostak-Pease broadcast algorithm

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Outline of the Presentation

Agenda

The problem

Minimum Spanning Tree in distributed systems

The primary problem addressed by the GHS algorithm is the efficient construction of a minimum spanning tree within a connected, undirected graph. This entails determining the optimal set of edges that connect all vertices of the graph while minimizing the total edge weight. This algorithm is essentialy the distributed version of the Kruskal's minimum spanning tree algorithm.

The problem

Byzantine Fault

The primary problem tackled by the LSP broadcast algorithm is the components within a system may fail in unpredictable ways, leading to inconsistencies in system behavior and communication. The difficulty lies in achieving consensus among the system's components, even when some of them are faulty or malicious. The Byzantine fault problem is not only theoretically intriguing but also practically significant.

Agenda

What is the solution/contribution

- Detailed implementation of the algorithms on the AHCv2 platform.
- Performance evaluation of the algorithms across diverse network topologies and usage scenarios
- Comparative analysis of the algorithms with previous approaches, highlighting strengths, weaknesses, and key insights .

Agenda

Motivation/Importance

- Solving the problem of constructing a minimum spanning tree is crucial for network management and communication efficiency in distributed systems.
- By efficiently establishing optimal connectivity, the GHS algorithm enables better resource-utilization.
- Example: Failure to find optimal broadcasting can lead to suboptimal network configurations, increased resource overhead, and diminished system efficiency.

Questions

THANK YOU

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