

***Peercracy: Self-Regulating
Peer-to-Peer Network Using
Feedback***

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P2P?

- Peer-to-peer computing?
 - New paradigm for computing
 - Every peers have **equal** positions
 - SERVENT: No role partition like Client/Server
 - Every peers **share** their resources
 - Types
 - Data sharing (Gnutella, KaaZaa...)
 - Access sharing (Peercast, Overcast...)
 - Computation sharing (SETI@home...)

Peercracy?

- Information service in P2P computing is
 - By the peer (Server's role)
 - For the peer (Client's role)
 - Of the peer (Sharing property)
 - Peercracy?

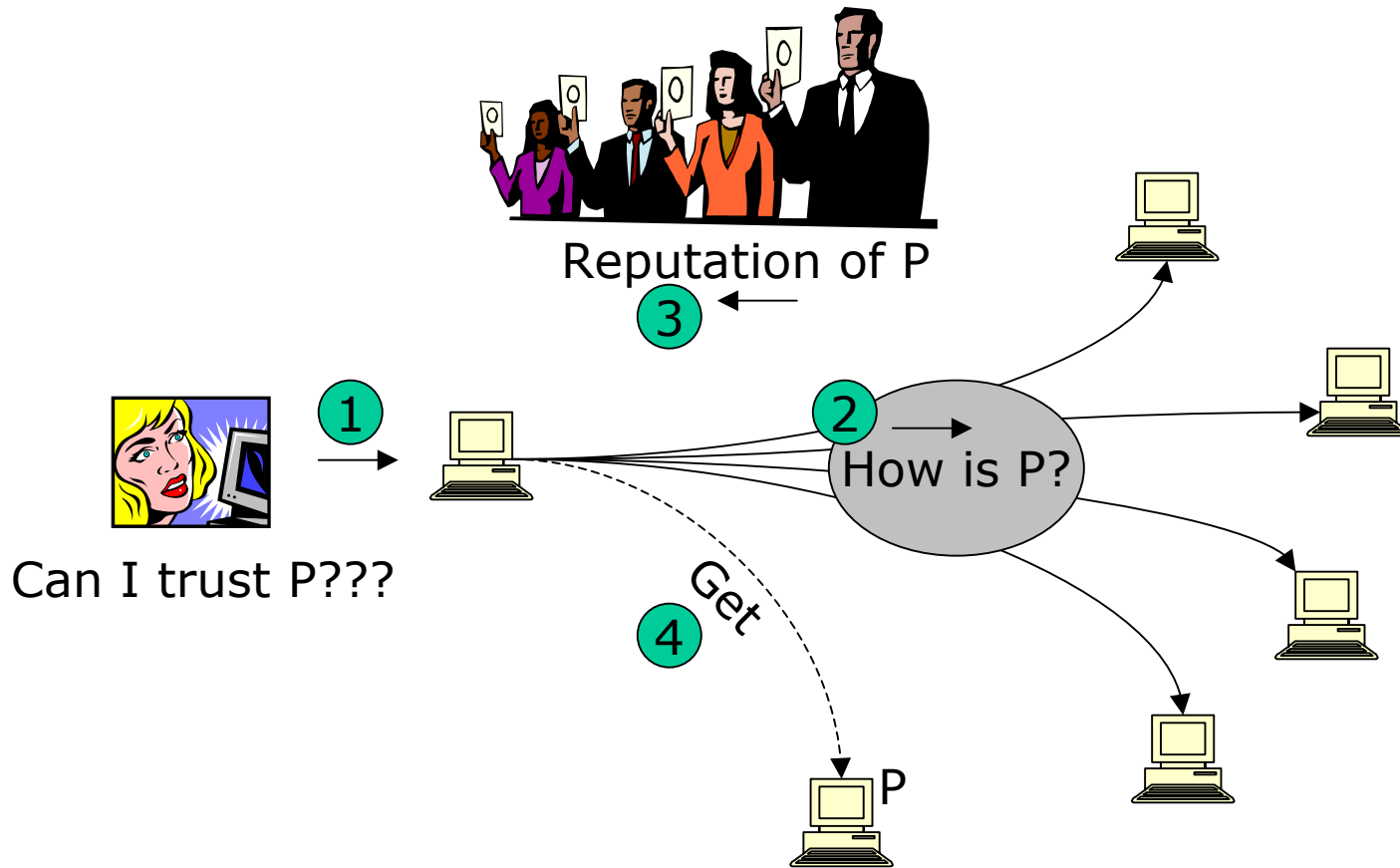
What is more *Peerocratic*?

- Peer should be safe.
- Peer should have a voice.
 - Active information dissemination
 - Views of the majority of peers should be reflected to the whole network.
- Greatest happiness of the greatest number

How can be?

- Peer should have a voice
 - In the forms of...
 - Feedback
 - Reputation
 - Gossip
- How can feedbacks affect the whole?
- When the feedbacks is useful?

Reputation based Trust*



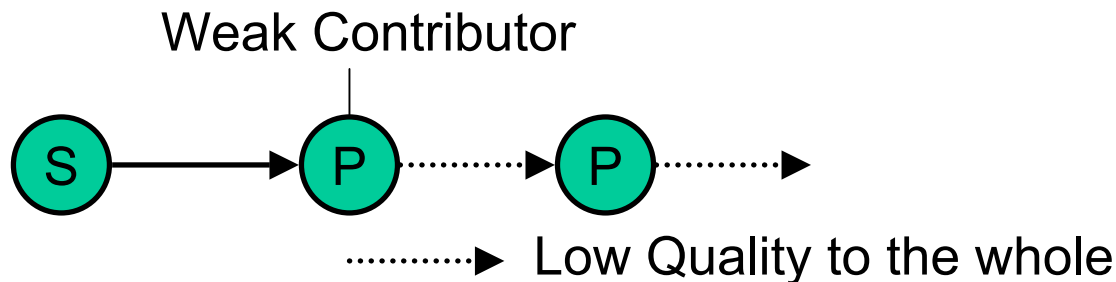
* Ernesto Damiani. et.al. "A Reputation-Based Approach for Choosing Reliable Resources in Peer-to-Peer Networks", In Proceedings of CCS '02,

Feedbacks For...

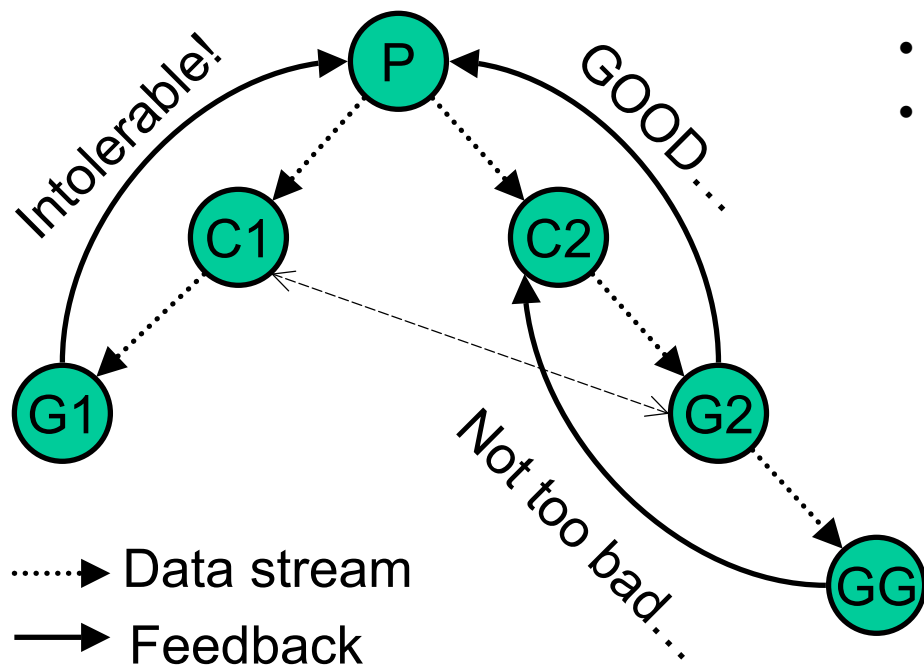
- Data sharing
 - Data integrity
 - Choosing reliable peer
- Access sharing
 - Efficiency
 - QoS
- Computation Sharing
 - Versions and correctness of the module.

Feedbacks in Access Sharing

- Objective
 - Reconfiguration of multicast tree
 - MST tree is optimal for video streaming
 - Incremental optimization for minimizing costs
- Problem (Extreme Case)



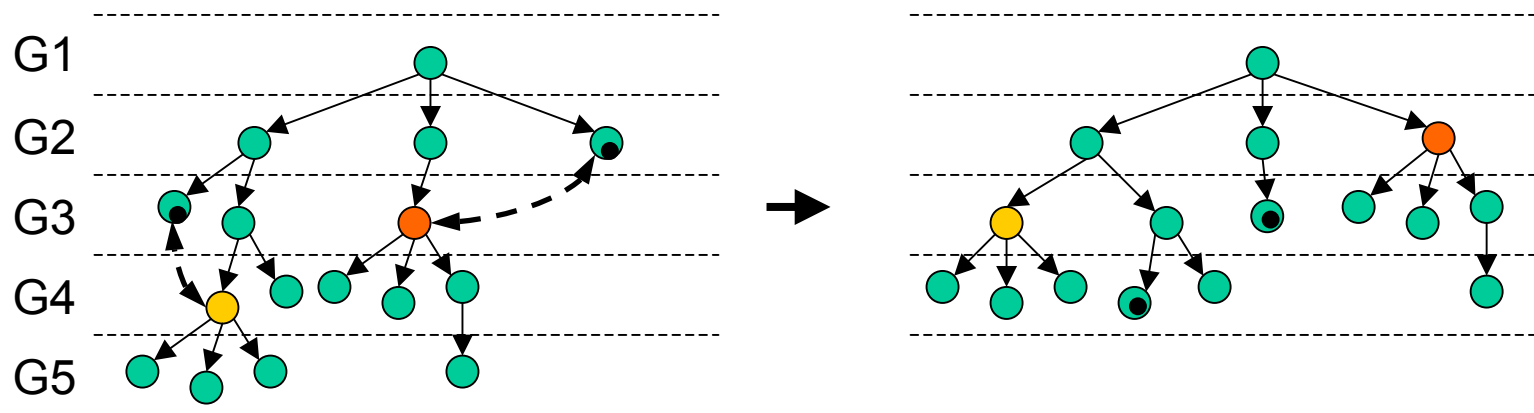
Local Optimization Only With 3G information



- *FC*: list of children's feedback
- *FGC*: list of grandchildren's feedback
- *CBC*: list of children's B/W contribution
- periodically compute
 - Compute *CBC* from $\{FC, FGC\}$
 - triggering the poorest child from *CBC*
 - Leafs or Poor contributors
 - ask the other child for a better one
 - Other children sends their own *CBC*
 - If a better peer found, reconfigure (swap) locally.

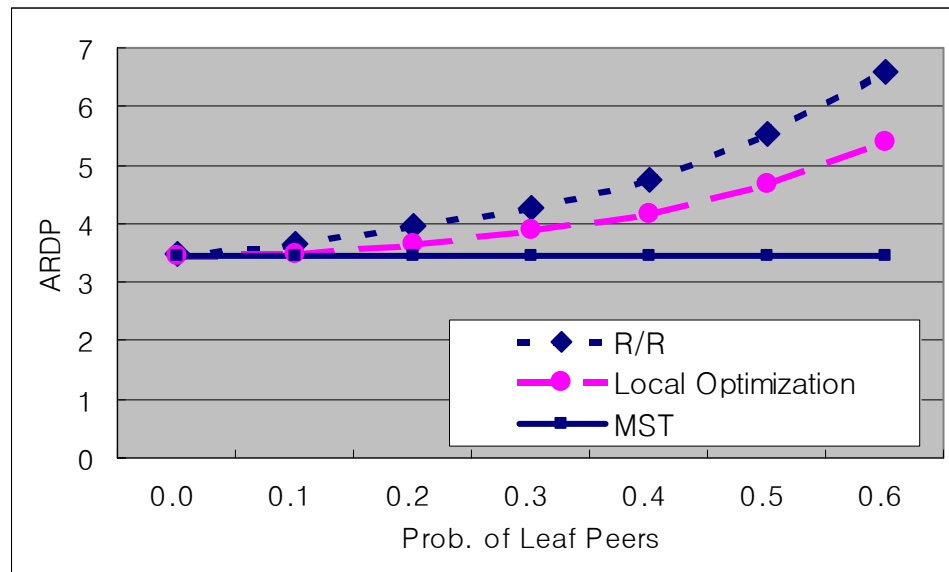
Incremental Reconfiguration with Local Feedback

- 1) G3's peers feedback to G1's
- 2) G1's peer knows that the leaf peer(black-dotted) has poor relaying performance among its children.
- 3) G1 asks G2s , for a better peer.
- 3) G1 found orange and locate orange peer in G2 instead the leaf.
- 4) In the same manner, yellow peer gets higher class.



Incremental Optimization

- Metric: ARDP (Avg. # of hops from the source)
- Nodes = 100, Max_Children = 3,



Conclusion & Discussion

- Peercracy is for the majority of peers
- Self-organization + Self-regulation
 - Absence of General Manager in P2P
- Dedicated feedback manager?