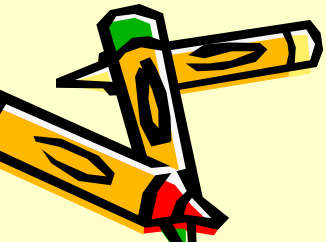# Improving QoS for Peer-to-Peer Applications through Adaptation

Kun- Yo Lin

Outline

- Introduction
- A GnuS
- Evaluation
- Discussion
- Hybrid system model
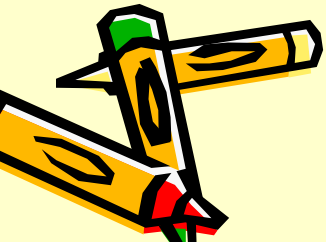- Conclusion

Introduction

- A peer-to-peer application should offer :
  - The ability to reliably reach any node connected to the network.
  - The ability to discover new resources on the network.
  - Adaptive behavior to compensate for the highly variable nature of peer-to-peer nodes.
  - Extensibility for supporting emergent application requirements.
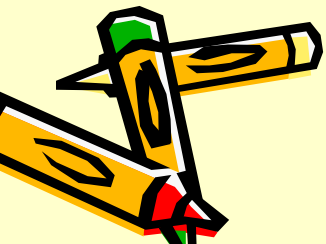
Gnutella

- Gnutella suffers from the following Qos issues:
  - Scalability
  - Harmful user behavior
  - Uneven Resource Distribution
  - Poor Quality files

AGnuS Seeking

- AGnus =Altruistic Gnutella Server

  A. Increase file availability across the network.

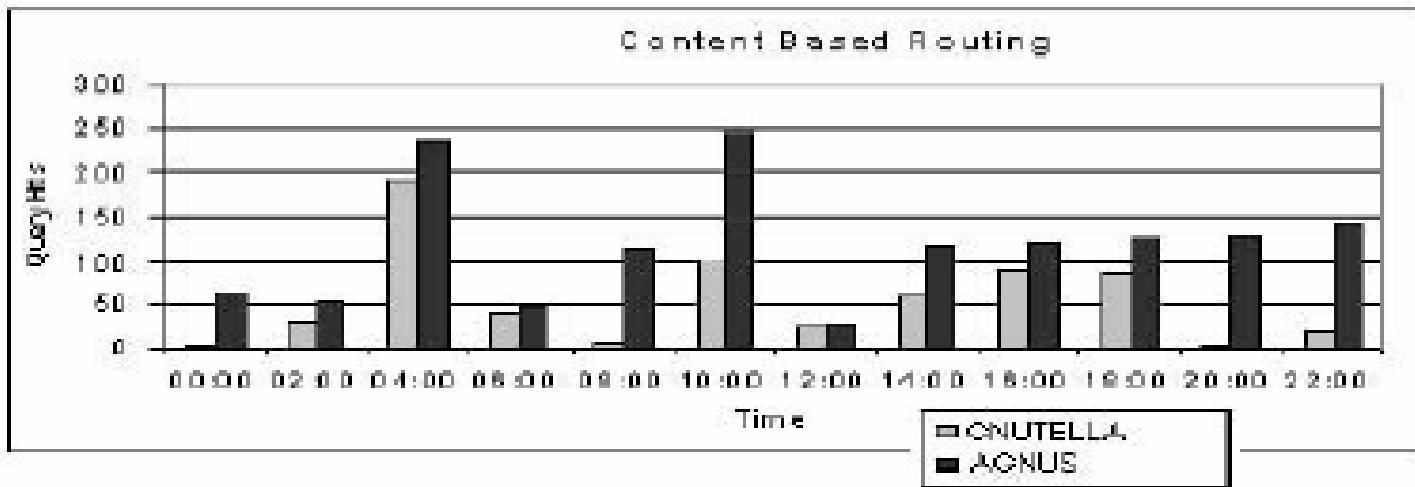 B. Increase network friendliness.

  C. Improve file quality.

  D. Reduce file-acquisition time.

	A	B	C	D
Caching	✓			✓
Load Balancing		✓		✓
Content Based Routing	✓			✓
File Filtering		✓	✓	✓

[Table 1 – AGnuS' QoS Enhancing Mechanisms]
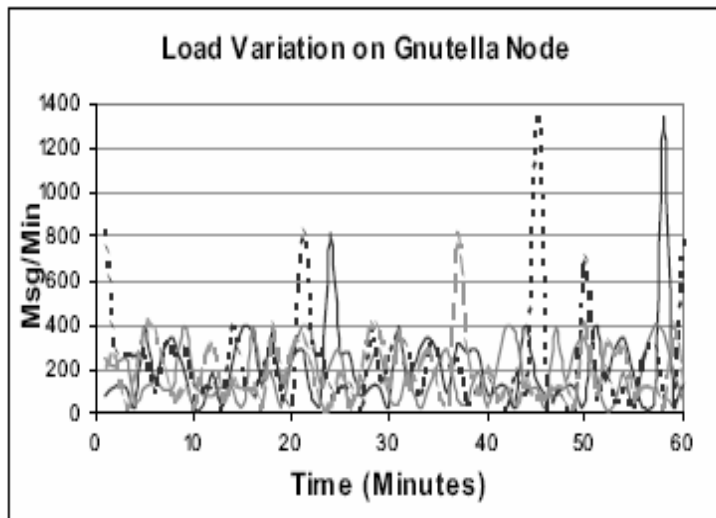
Evaluation

- Increased file availability (68%)

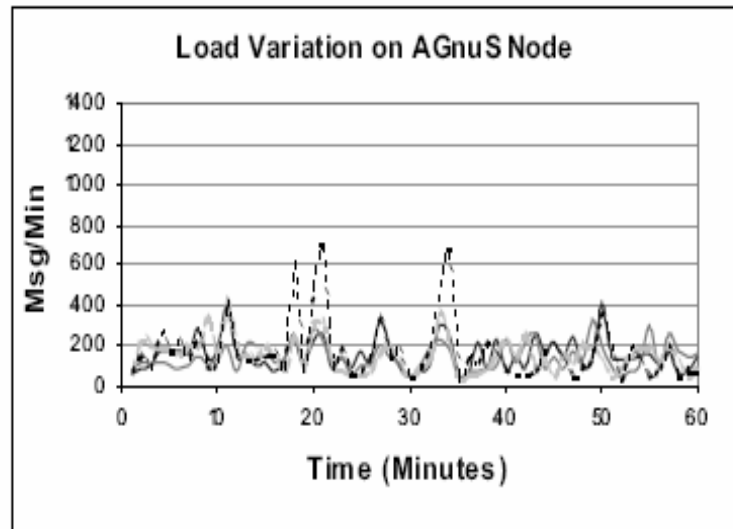[Figure 2 – Content based routing increases QueryHits]

Evaluation

- Increased network friendliness(56%)

Gnutella

AGnuS

Load Variation on Gnutella Node

[Figure 3 – Unbalanced load variation]

Load Variation on AGnuS Node

[Figure 4 – Balanced load variation]

Evaluation

- Improving File Quality(22%,82%,16%,70%)

Standard Gnutella Node				
	Audio	Video	Software	Text
T1	67%	5%	10%	40%
T2	75%	7%	12%	20%
T3	56%	9%	10%	33%
AGnuS Node				
T1	88%	67%	25%	100%
T2	92%	100%	30%	100%
T3	85%	100%	25%	100%

[Table 2 – Quality files downloaded (%)]

Discussion

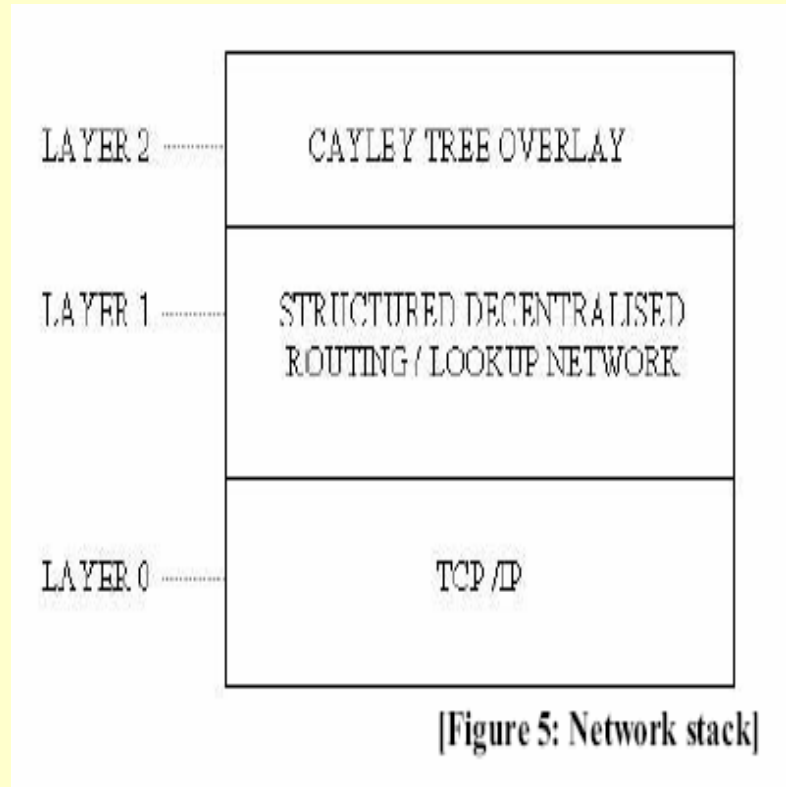- Semi-centralized
  - Napster /SETI /Kazaa

- Structured decentralized networks
  - Pastry /Chord
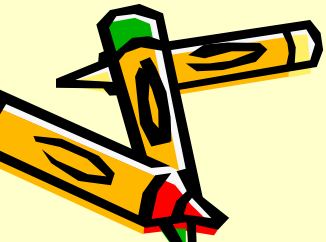
Hybrid System Model

- Multiple levels of adaptation
  - Network restructuring
  - Routing behavior adaptation
  - Peer-selection adaptation

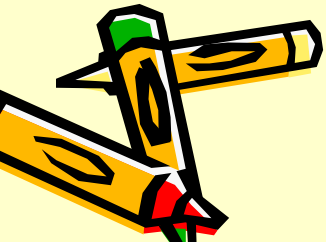|	
LAYER 2	CAYLEY TREE OVERLAY
LAYER 1	STRUCTURED DECENTRALISED ROUTING / LOOKUP NETWORK
LAYER 0	TCP/IP

[Figure 5: Network stack]

Conclusions

- AGnus offers the following Qos improvement
  - Increased file availability.
  - Increased Network Friendliness.
  - Increased file quality.
  - Improved file acquisition time.
- We begun work on a hybrid system, and it can be used for other function
  - Peer-to-peer chat
  - Video files and chat synchronal

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