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NS Scaling and Visualization

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Vint Goals

provide a simulation platform for Internet research

- easy protocol comparison: *(user contributions)*
  - TCP *(Vegas)*
  - multicast *(MFTP, RPM, etc.)*
  - QoS
  - *(MAC-layer protocols)*
- scale to many nodes (50K?)
- visualization aids
- protocol validation

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VINT Scaling

Goal: scale to 50K nodes with similar sim API.

Why?

- reuse simulator parts (scheduler, trace file, etc.)
- easy to examine detailed behavior

Approach: *abstraction*

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Network Simulation Abstractions

- abstract MAC layer to simple loss model
- abstract detailed routing to centralized
- abstract TTL checking (often not needed)
- abstract detailed packet flow (replace with end-to-end estimate)
- abstract cross traffic (model with aggregate flow)
- abstract topologies (idealized string, tree, star)

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Network Simulation Abstractions

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Abstraction Example: Packet Flow

Approach: in some large multicast sims, congestion is not relevant. Ignore queueing delays.

Session sim.

(Polly Huang's session-sim demo)

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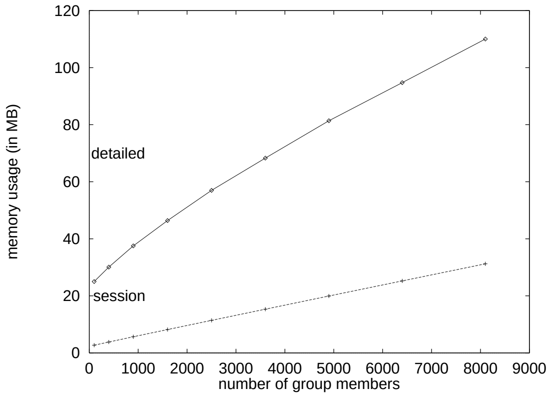
Abstraction Example: Packet Flow

Abstracting packet flow saves substantial memory:



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Abstraction Alone Not Enough

- abstraction and implementation improvements go together
- validate abstract model by comparing to detailed sim
- hybrid simulations allow mix-and-match

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Visualization Goals

- large-scale visualization
- non-packet visualization
- additional interactivity

Active work:

- interactive editing
- topology auto-layout
- state-graphs and packet visualizations
- collaboration with Lucent?

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Visualization Demo

(Mark Handley's mbone loss visualization)

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Other Demos

For other demos, visit the poster session tonight.