Video Streaming
In
Online Social Networks

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Why distributed streaming?

- Usual scalability issues:
  - Target: performances enhancement (source, viewers)
- Multicast doesn't always work;

- Streaming:
  - Live Streaming
  - **Video On Demand**

  Different kind of challenges

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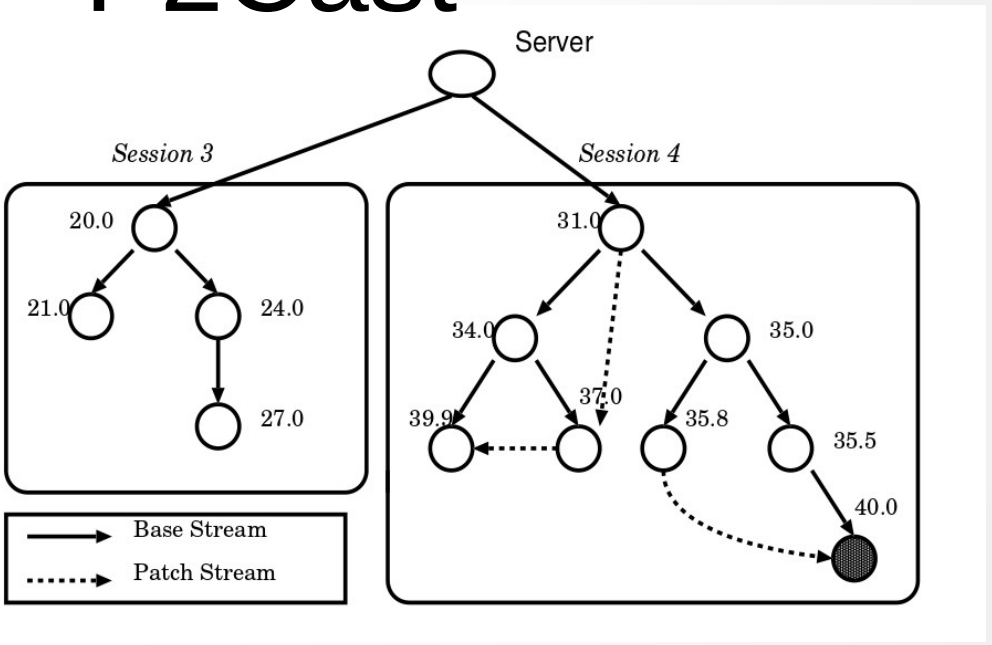
Tree-based topologies

Earlier solutions: *tree-based* overlays

- Source (server) is the root
- Drawbacks:
  - Network fluctuations
  - Low resilience
  - One-to-one data delivery

Example: P2Cast



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Mesh topologies

- Per-video overlay
- Many-to-one topologies
  - Avoid issues of tree configurations

  Example: CoolStreaming (aka DONet)
- “Data-driven overlay” — i.e. Per-video topology
- Neighbors gossiping: indexes of owned chunks
  - Room for 120 chunks, 1 second each
  - Schedule actual chunks exchange

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Ring topology

- RINDY overlay:
  - Ring overlay → multi source among viewers
  - Gossip system → share chunks metadata
  - Orthogonal overlay for VCR operations
    - e.g. Fast forward? Join a neighbor ring

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Social Overlays

- Point: use the social links as video delivery overlay
  - Exploit the social structure underneath.

- Examples:
  - NetTube
  - SocialTube

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NetTube

- Context:
  - Peer to Peer for sharing a video is good, but not in general;
  - Statistics of Youtube: many videos are short;
  - The overlay construction takes more than time the video length itself.
- Observations:
  - User behavior: switch from one video to the other;
  - Bounded (usually small) number of related videos.

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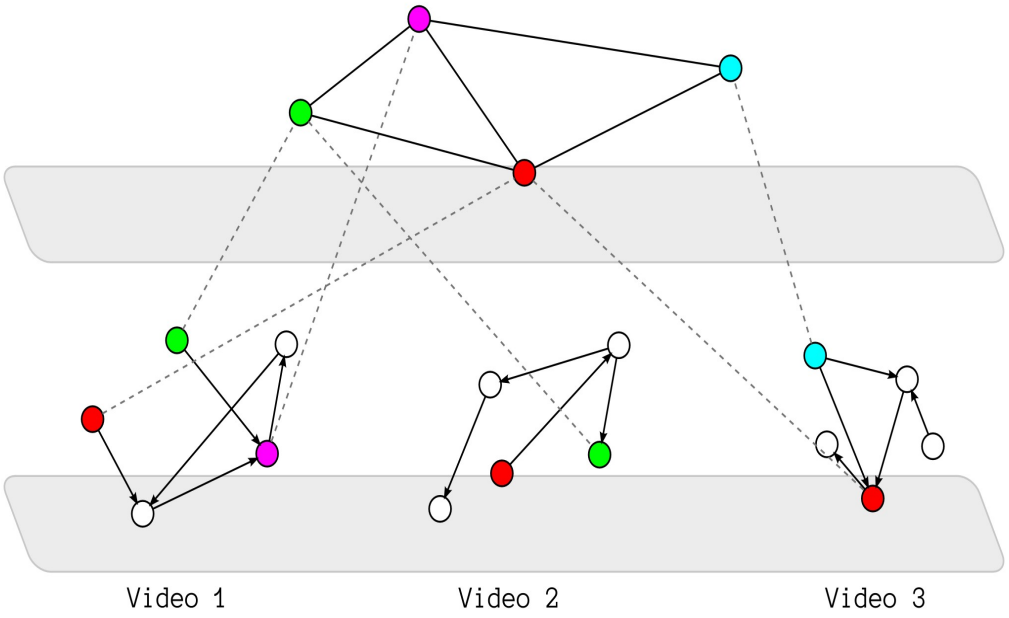
NetTube

- Peer assisted:
  - The server owns the video
  - The watcher becomes a potential supplier.
- Two overlays:
  - **Lower overlay:** clients who watched the video
  - **Higher overlay:** quickly find the overlay for a related video.



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SocialTube

- Driving facts:
  - Videos are mainly watched by friends: two-hops social circle;
  - Other users may be interested in the videos (topic);
  - Workload reduction and performances enhancement improve user experience.

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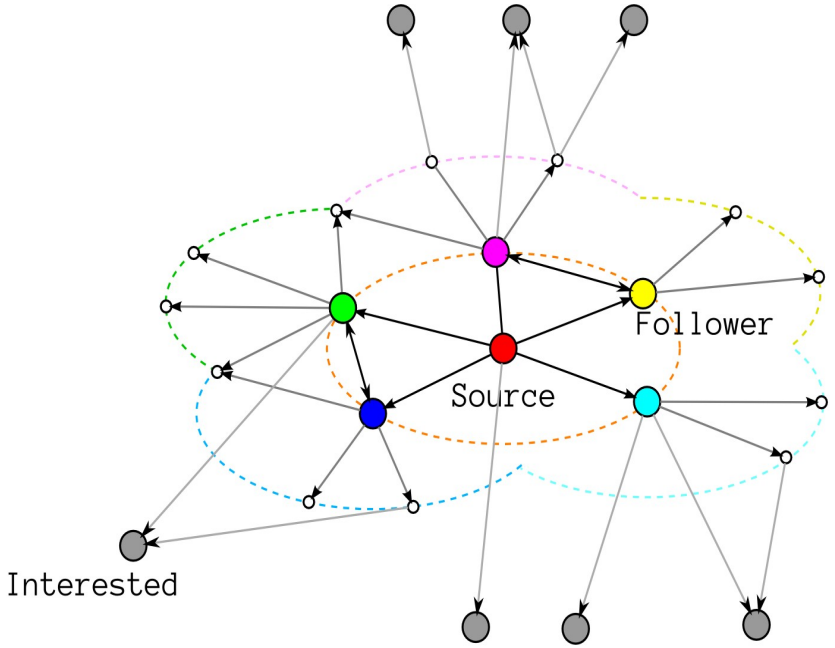
SocialTube

- Peers cache the video for redistribution: chunks of constant size;
- Per-source overlay:
  - Hierarchical structure, rooted in the source;
  - Followers work as pseudo-source
- Push-based pre-fetching:
  - The source pushes the first chunk to followers and interested
  - The watchers will pull the remaining part (if required).



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References

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