Content Replication for Internet P2P Applications

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Overview of Current Internet P2P Applications

- **Current Internet P2P may cause high volume of traffic to scatter and traverse multiple network links, leading to high load on network carriers. One reason is the network-oblivious peering of resources, which is also known as P2P overlay-network underlay mismatch.**

- **P4P WG has reduced the load on network carriers caused by Internet P2P through deploying iTracker to localize P2P traffic. However, the uplink bandwidth of peer hasn't been saved in current P4P solution, which means that the uplink capacity of peer can still form bottleneck of P2P application.**

P4P Modes

1. Peer query Tracker
2. AppTracker quarries iTracker (3)
3. iTracker sends peering suggestions (2)
4. Tracker updates peers' list
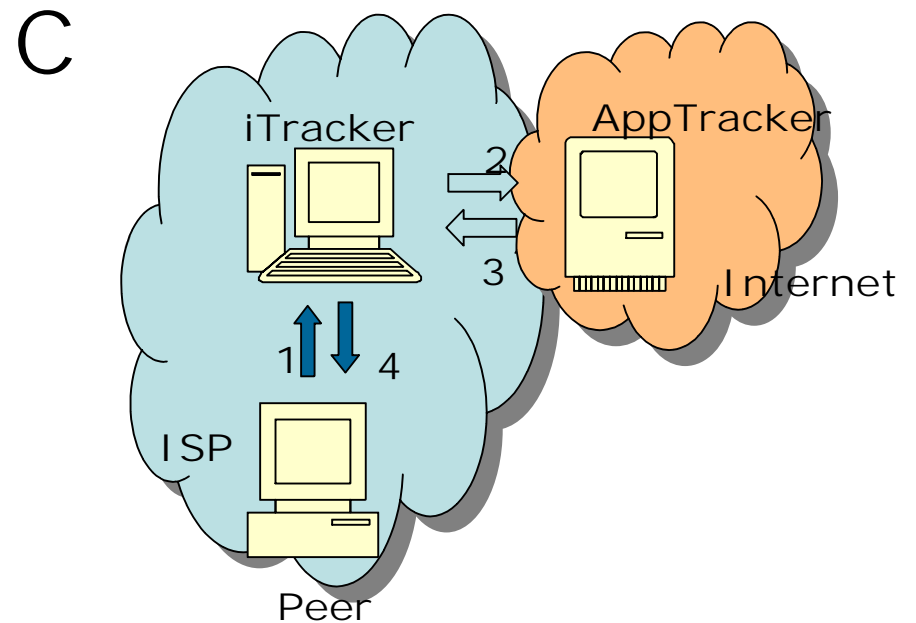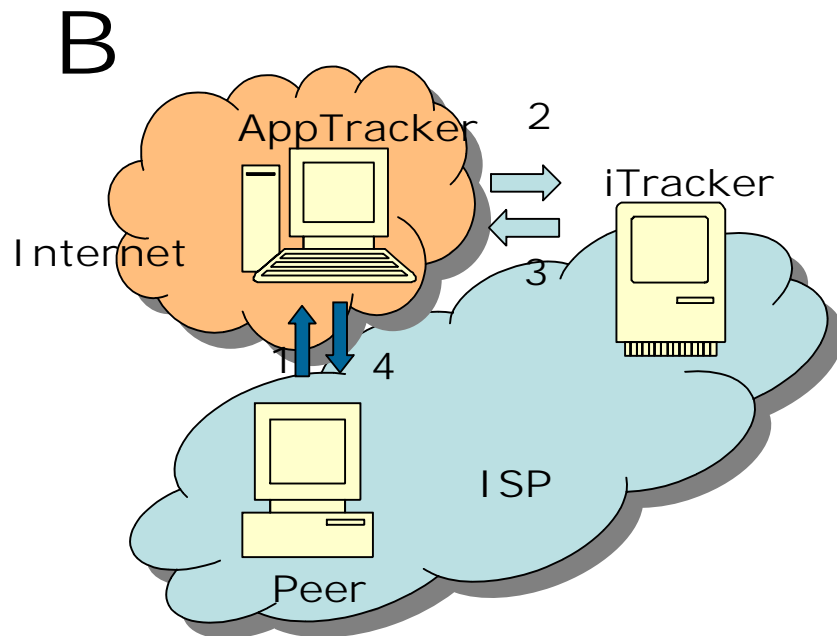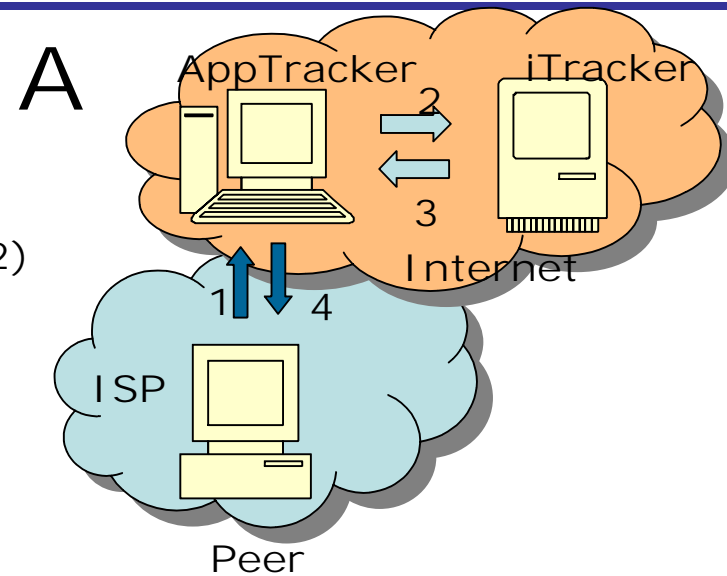
iTracker Cannot Save Uplink Bandwidth of Peer

- Two ISP users – A and B are requesting same resource;
- Due to the imbalance of uplink/downlink bandwidth of peer (e.g. ADSL access), multiple serving peers are required for each request.
- Assume A requires serving peers 1,2,3,4 and B requires serving peers 5,6,7,8
- It can be observed that the limited uplink capacity of peer will not only form bottleneck (e.g. 1 and 5 from one host) of P2P application but also cause inter-ISP traffic (e.g. 4,6,7 from other ISP users).

Internet

AppTrackers

Internet User

ISP User

iTracker

ISP
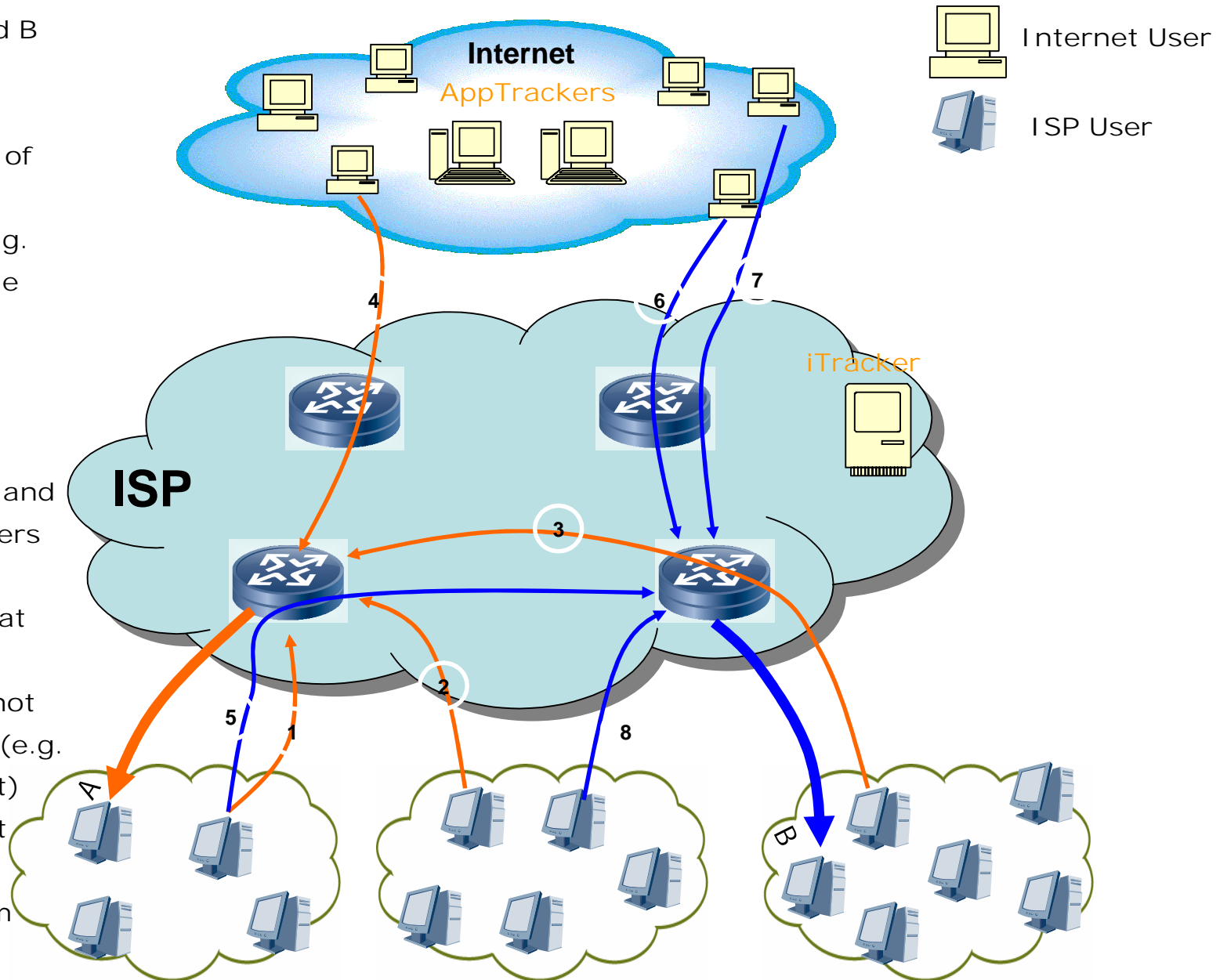
Combine iTracker and Traffic Duplication to Save Uplink Bandwidth of Peer

- In ISP network, deploy Service Agent Node (S_Node) capable of duplicating traffic.
- iTracker sends resource request to S_Node upon receiving multiple requests for same resource.
- Now only 4 serving peers 1,2,3,4 are required to send packets to S_Node. S_Node duplicates and forwards P2P traffic to multiple ISP users - A and B.
- This method effectively saves the uplink bandwidth of peer, thus not only alleviates the bottleneck of P2P application but also reduces inter-ISP traffic.

Internet
AppTrackers

Internet User

ISP User

S_Node:

Service Agent Node

iTracker

ISP

S

A

1

2

4

B

3
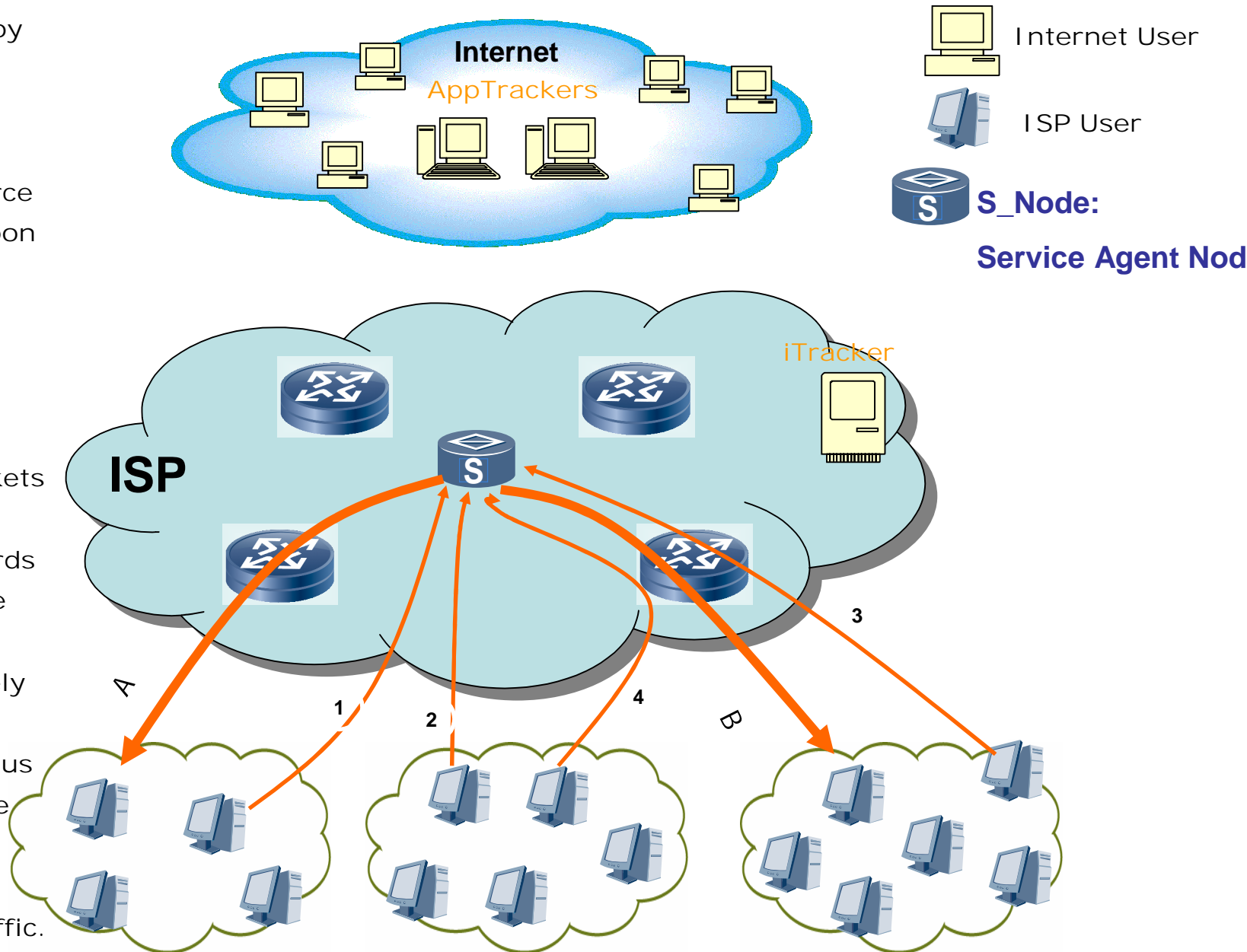
Summary

- **Service Agent Node is deployed to save the uplink bandwidth of peer by aggregating same or similar resource requests, finding a small number of serving peers, and duplicating/forwarding P2P traffic to multiple users.**

- **The more users who request for a same resource, the more uplink bandwidth of peer and inter-ISP traffic are saved.**

Thank you