

# **Tension between P2P and Service Providers?**

## **Internet traffic trends and player incentives**

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# P2P content delivery

Peer-to-peer (P2P) networks use direct communication between “peers” to support a service or application

- Alternative to client-server approach

Who uses P2P applications for content delivery?

- End users: use P2P to get content
- Content providers: use P2P to reduce distribution cost

Poorly designed P2P applications can cause

- Inefficient use of network resources
- Resource contention with other applications

Small number of users consume significant fraction of bandwidth

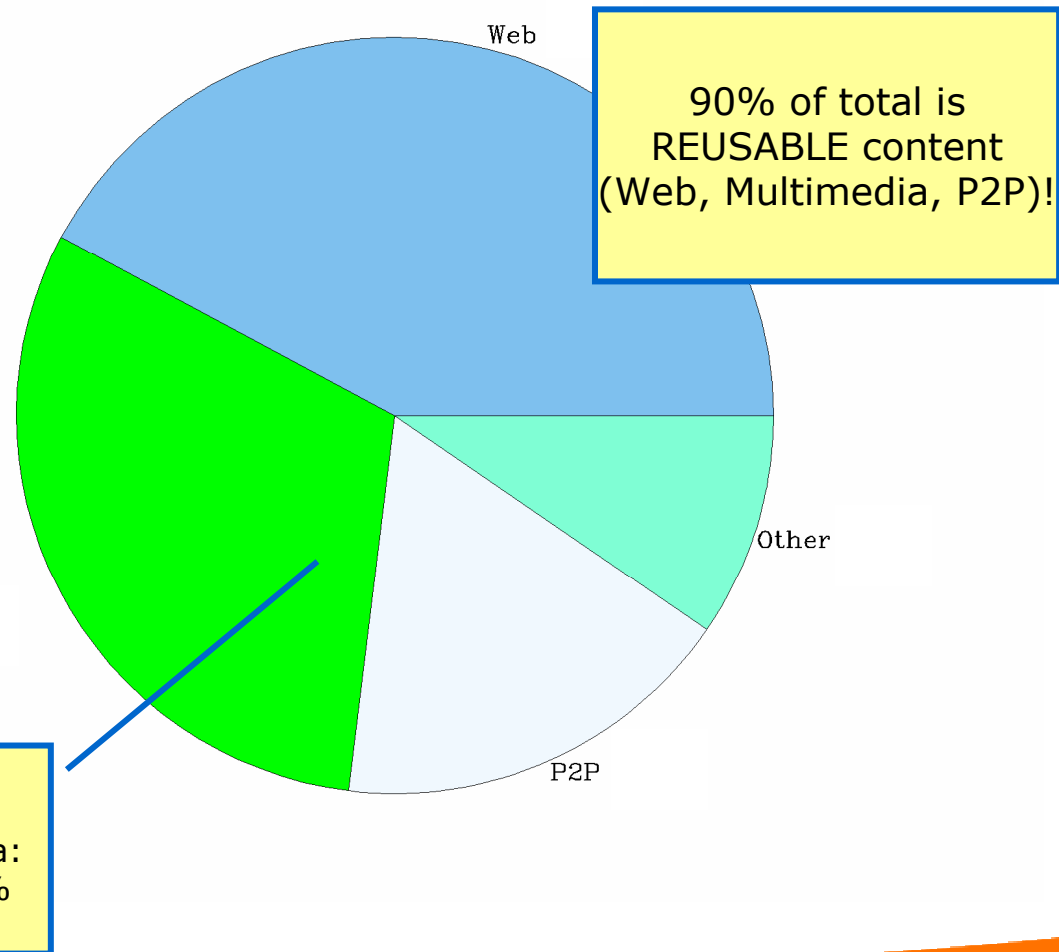
# Current Application Mix on the Internet (U.S.)

## Busy hour is 1/3 Explicit Multimedia

**Web:** HTTP traffic with a non-video mime type.

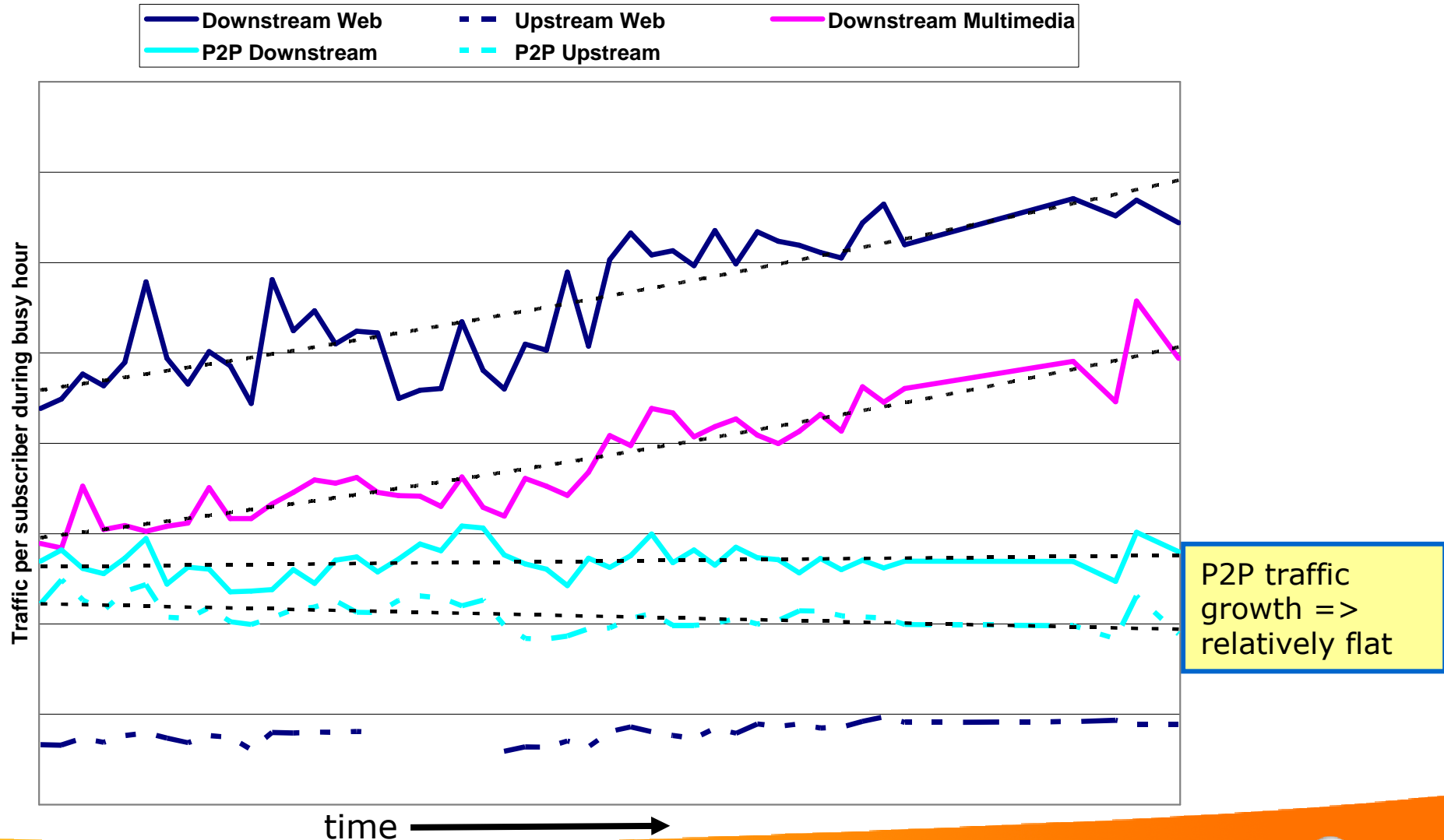
**Explicit Multimedia:** Video/Audio HTTP traffic and streaming video protocols such as RTSP, RTMP.

**P2P:** File Sharing applications such as BitTorrent, Gnutella, etc. (more than 50% video)

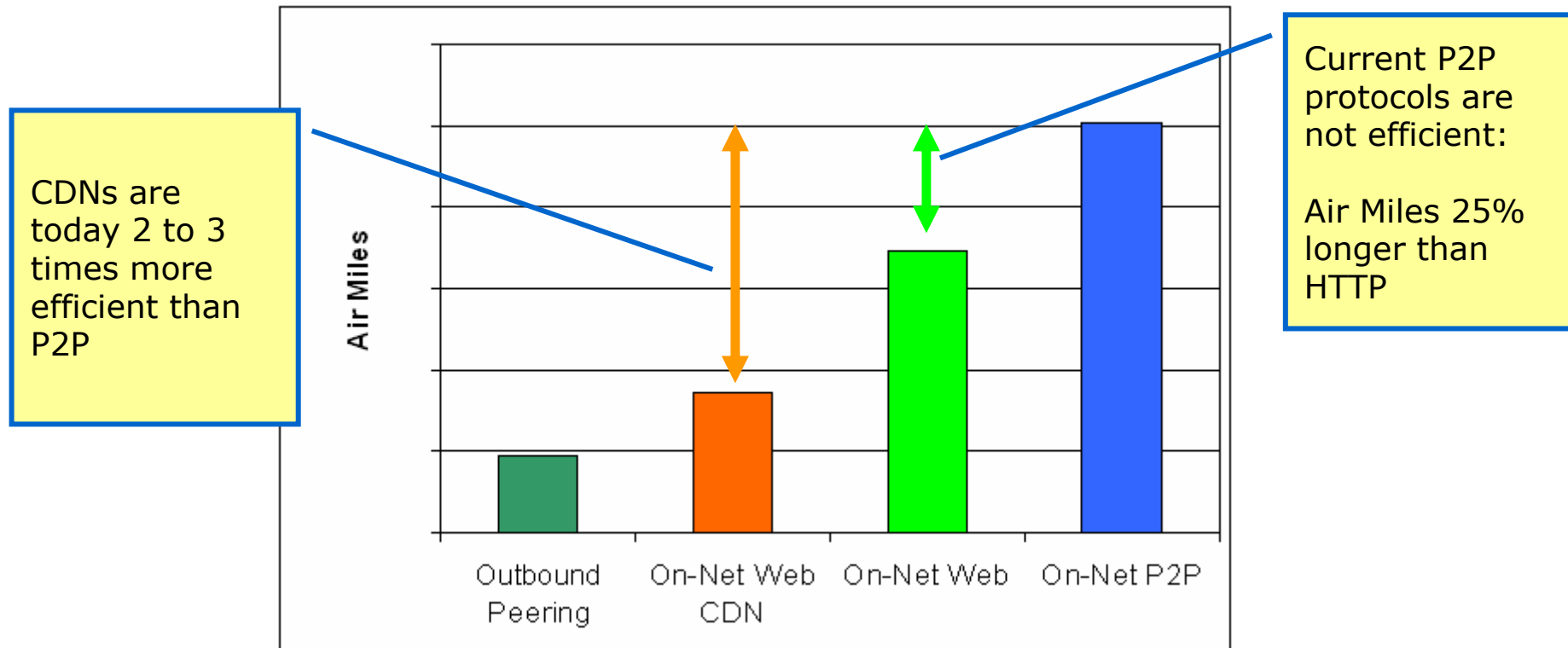


# Content Growth over the last Year

## Multimedia/sub: +86% CAGR



# Efficiency of content delivery mechanisms



Average distance traveled by content on U.S. backbone

# Player Incentives

## End user

- Get interesting content, ease of use

## Content provider

- Protect valuable assets

## ISP

- Provide good service, manage cost

## CDN

- Provide good service, manage cost

## P2P application provider

- Attract users, provide good performance

## P2P tracker operator

- Ad revenue

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**Do proper incentives exist to improve P2P efficiency?**