



# P2P-NEXT

EUROPEAN UNION FRAMEWORK 7 PROJECT

## WWW.P2P-NEXT.ORG

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# Talk Overview

- P2P 101
  - ▣ Factors motivating the development of P2P
  - ▣ The technical challenges
  
- The P2P-Next project
  - ▣ Project Goals
  - ▣ P2P-Next Vision
  - ▣ Low Cost Consumer Electronics Device
  - ▣ Living Labs
  
- Whats Next?



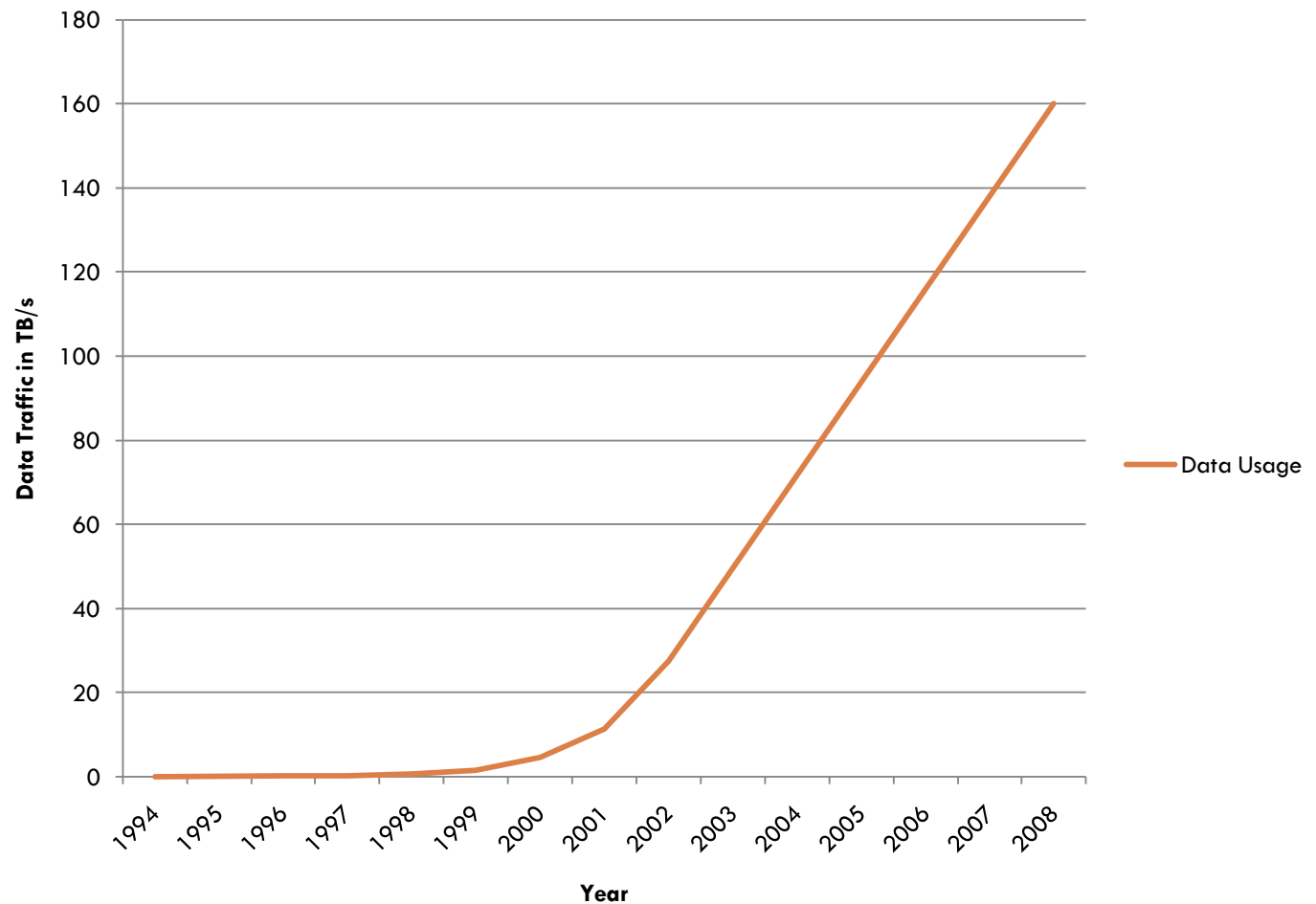
# P2P 101

# The Internet: A resource for sharing material



## Estimated World Wide Internet Data Traffic

Year	Data (TB/s)
1994	0.006
1996	0.1
1997	0.2
1998	0.6
1999	1.6
2000	4.5
2001	11.3
2002	27.6
2008	160



Source: White, Bobby (2008-06-16). "Cisco Projects Growth To Swell for Online Video", *The Wall Street Journal*.



# Keeping up with demand?

- A solution is needed that provides a **low cost, scalable** platform for **streamed** delivery of HD media, that can scale from one to millions
  
- How?
  - ▣ More servers
  - ▣ Caches/CDNs
  - ▣ P2P



# Motivating P2P

- Servers, Bandwidth & Storage costs money...
  - ▣ What about indie productions or niche markets?
  - ▣ Sharing HD content amongst friends
  
- Establishing CDNs is time consuming, expensive and rarely scales to flash crowds
  - ▣ Plus they can't store long tail content



# P2P... has its uses?

## □ P2P

- ▣ Participants within a Peer-to-Peer network are both consumers and providers of network services, interacting without the use of intermediary network hosts

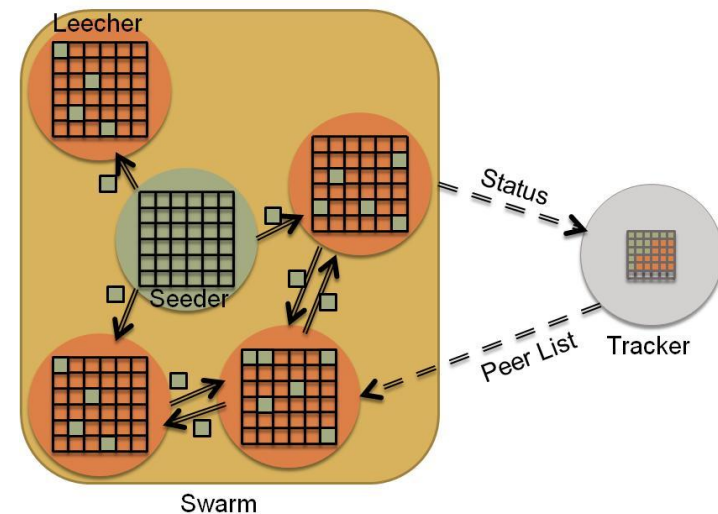
## □ Isn't it a bit old?

- ▣ P2P was designed as a best effort, non-time sensitive protocol
- ▣ The need for on-demand streaming has forced a change to the way in which P2P operates
- ▣ For example BitTorrent...



# BitTorrent: Live ~~Download~~ Policy

- Download everything, order isn't important
- Download the rarest chunk first
  - ▣ Other nodes are unlikely to have it
  - ▣ Increases chunk availability
- Download as many chunks as possible at the same time
- Data integrity verified using hash from torrent file







# Peer to Peer: Open Issues (1)

- Underlay Network:
  - ▣ Firewalls & NATs
  - ▣ Supporting heterogeneity of devices and connections
  - ▣ Dealing with asynchronous connections
  - ▣ Impact on infrastructure
  
- Overlay Network:
  - ▣ Construction
  - ▣ Incentives and Fairness
  - ▣ Churn (Peers leaving and joining the network)
  - ▣ Scalability of a tracker (Gossip Protocols)



# Peer to Peer: Open Issues (2)

- Content:
  - ▣ Locating and Indexing Content (Metadata)
  - ▣ Trust (How do I know this it really Children's BBC?)
  
- Advertisements & Payment Systems
  - ▣ No such thing as channels, no advert breaks, new approaches required
  - ▣ How to provide a payment service in a decentralised, non-authoritative system
  - ▣ How will it work with long tail content?
  
- Interactivity (Red Button)
  - ▣ How can users interact both with content and socially with friends through a P2P media distribution system?

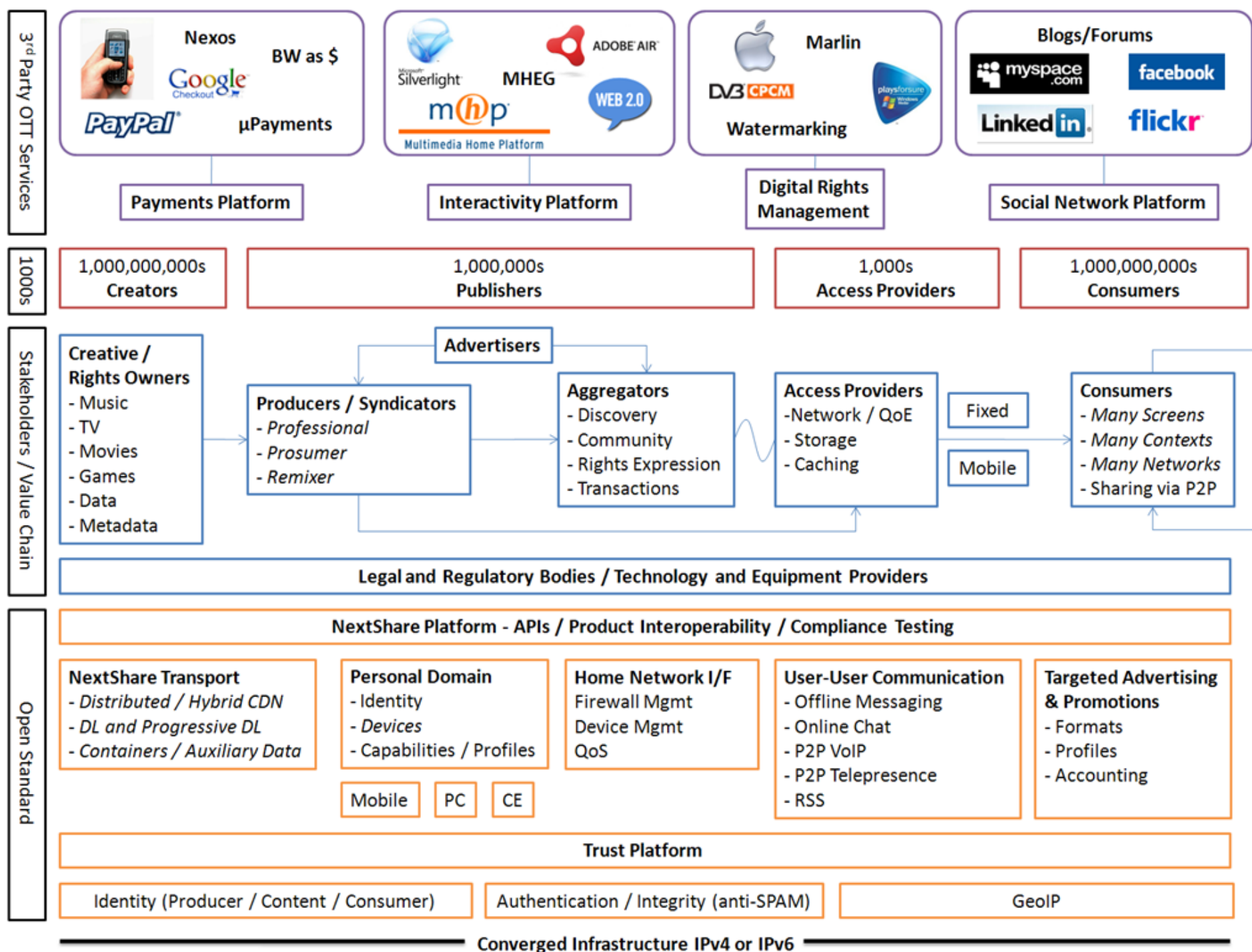


# The P2P-Next Project Overview



# Project Goals

- Develop
  - ▣ An open source, efficient, trusted, personalized, user-centric, and participatory television & media delivery mechanism
- Centred Upon
  - ▣ social communication and collaboration
- Exploiting
  - ▣ the emerging Peer-to-Peer (P2P) paradigm
- While
  - ▣ taking into account the existing EU legal framework



# Applications Design and Development



- “The Product” – To deliver live television to the PC and STB
  
- Priorities:
  - ▣ Discovery of high-quality content
  - ▣ Quality of experience
  - ▣ Zero administration
  - ▣ Social interactivity
  - ▣ Commercial exploitation

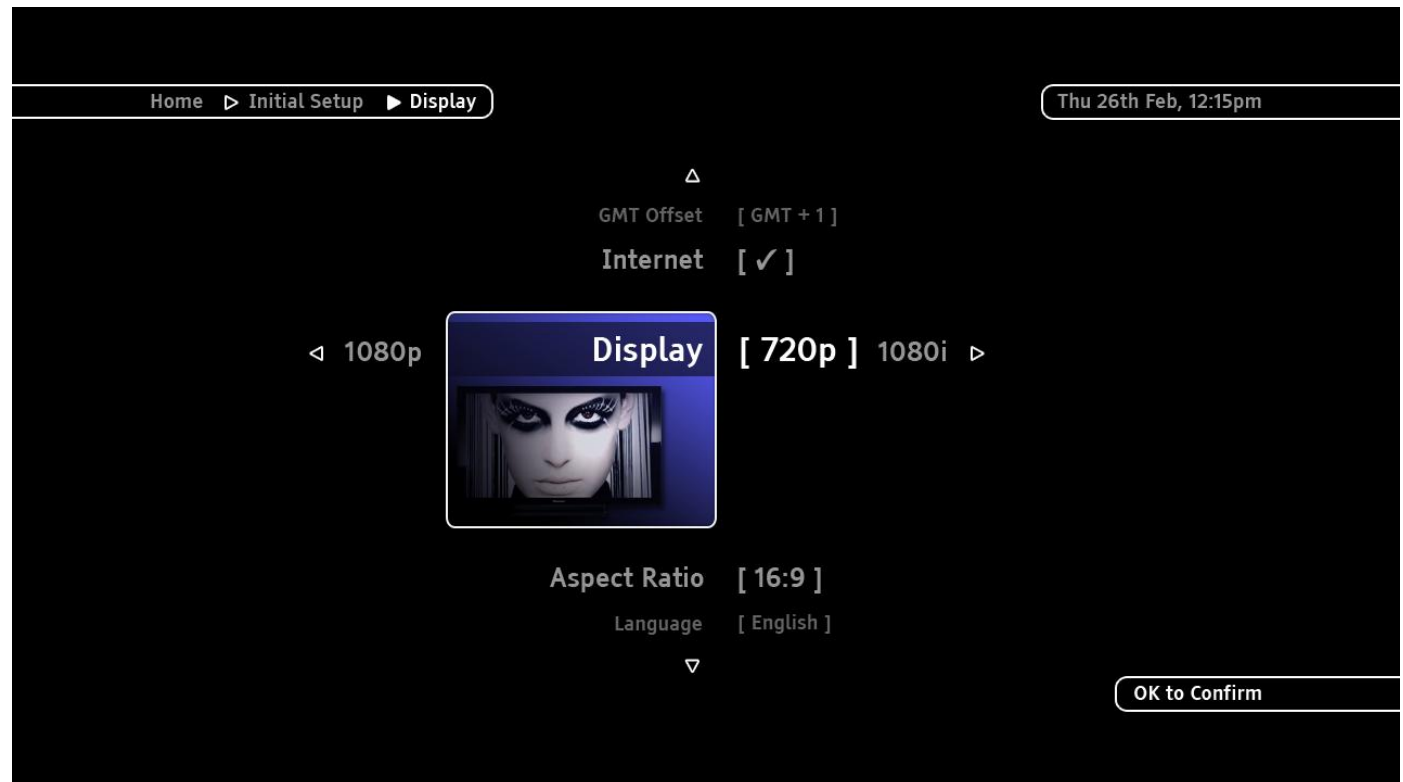
# Hardware Design



# Applications Design and Development



- When first switching on the NextShareTV device, consumers must perform initial setup including establishing Internet connectivity:

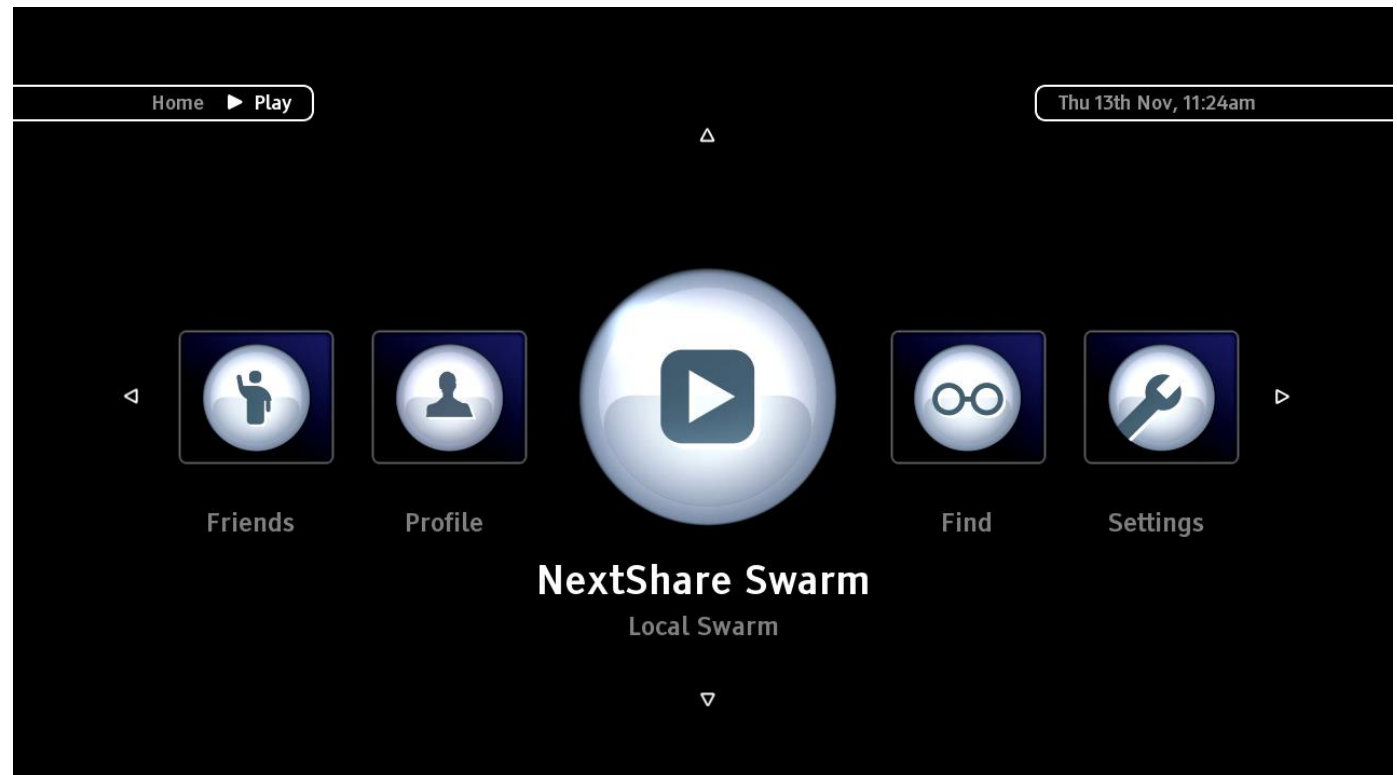




# Applications Design and Development



- Once initial setup is complete, the user is able to see the main menu of the NextShareTV application and access content services:



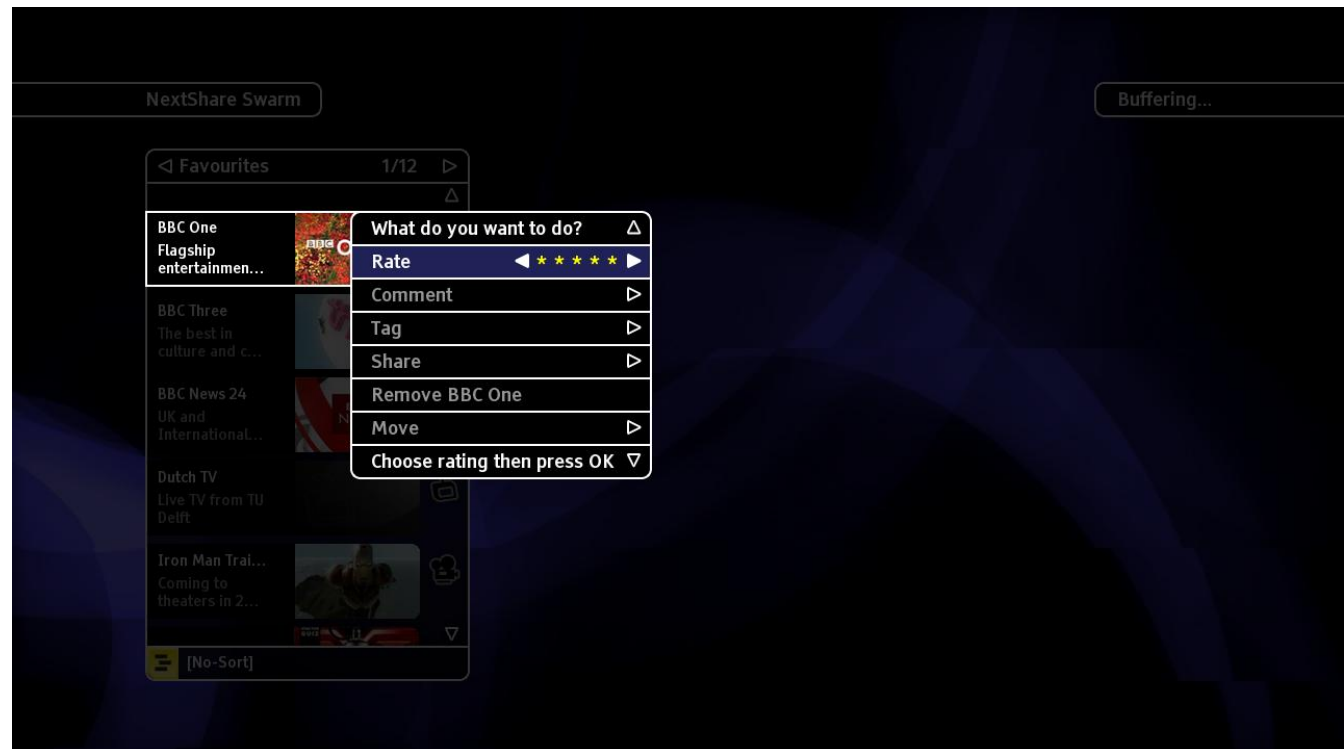
# Applications Design and Development

- Whilst watching content, the user is able to use favourite content application that enables quick selected of favoured content:



# Applications Design and Development

- Users are able to engage with a community to social tag, rate, or comment on an item of media, or share it with others:





# Living Labs

Testing in the Wild....

# The P2P-Next Living Lab

## Objectives

- The deployment of a series of test-beds across Europe:
  - ▣ to evaluate the effectiveness of P2P-Next through extensive and continuous user trials
  - ▣ facilitate experimentation and assessment of our approach
    - between all project partners and the end-user community
    - across both PC and consumer set-top box (STB) platforms
    - Across heterogeneous communications infrastructures







Now What?



# Now What?

- Currently at the half-way stage...
- Launch of complete end-to-end chain for P2P-Next at IBC 09 (both PC client and CE device)
- Start of user trials & Living Labs
- Opportunities to access Instrumentation/Statistics



# Questions?

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UNIVERSITY

