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Analysis of Architectures for Audio-Video Services Distribution in Hybrid IPTV/DVB-C Networks

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Overview

- ◆ Audio-video distribution- the business model
- ◆ DVB-C distribution
- ◆ IPTV distribution - Hybrid distribution
- ◆ Our experimental network
- ◆ The costs of embedded distribution system
- ◆ Future work
- ◆ Conclusions



Audio-video distribution- the business model

- ◆ Audio-video distribution today
 - Triple play networks: telephony, TV, data (Internet access)
 - Built on simple (homogenous) networks – DVB , IPTV

Each technology has its own advantages and limitations

DVB – best QoS for audio-video distribution

– limited number of channels

IPTV- relative ease of implementation of interactive services

- Difficulties to guarantee the QoS and QoE for audio-video services

Solutions: Hybrid solutions – both methods used for distribution in an hybrid network



DVB-C distribution

◆ Basics

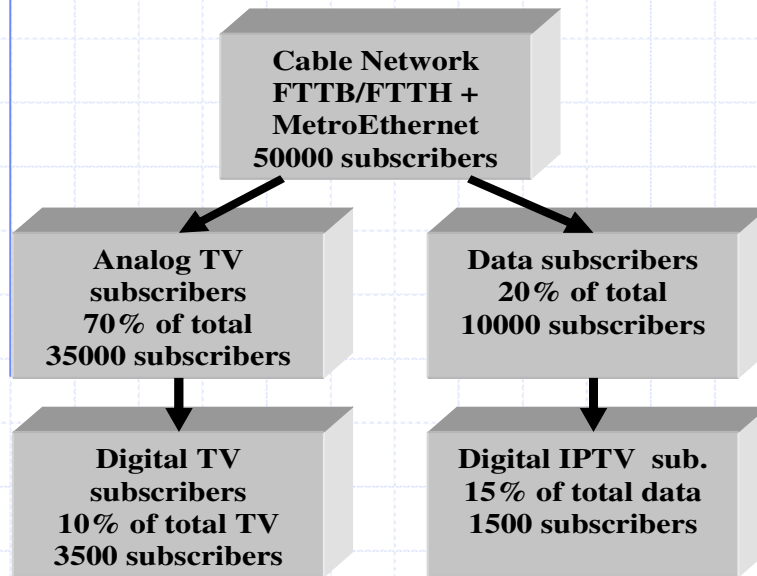
- Use of coaxial or hybrid (fiber –coaxial) physical networks
- Use DVB-C and DVB-C2 standards released by DVB consortium
- Possibility to implement the data (using DOCSIS) transfer in the same network

◆ Challenges

- Difficulties to allow CAS (conditional access) to copyrighted content
- Difficult to create individualized packages
- Difficulties in distribution of interactive content



DVB-C - typical cable network subscribers

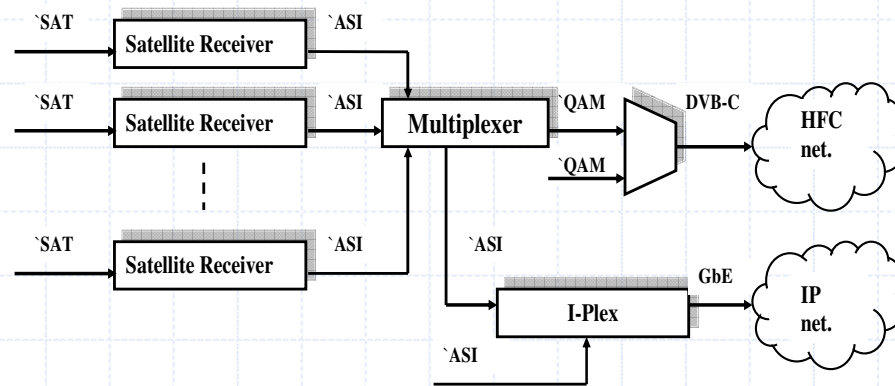


A scenario of subscribers structure in a typical cable TV network

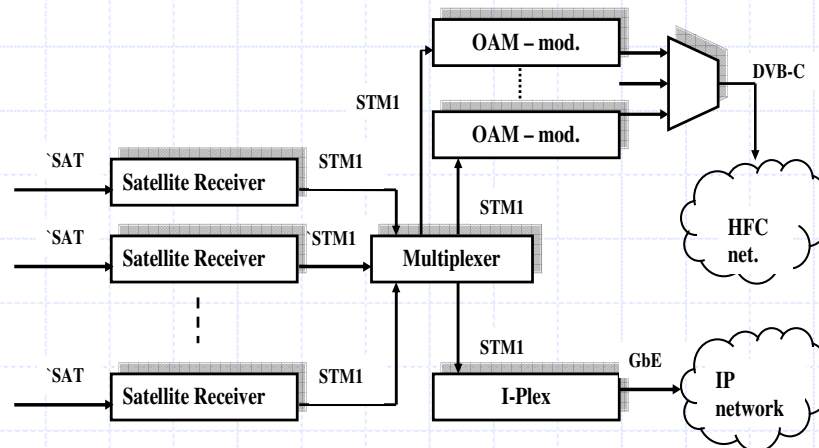
The subscriber structure is variable from provider to provider, around the values presented, the percentage of digital subscribers is growing constantly



IPTV distribution – Hybrid distribution



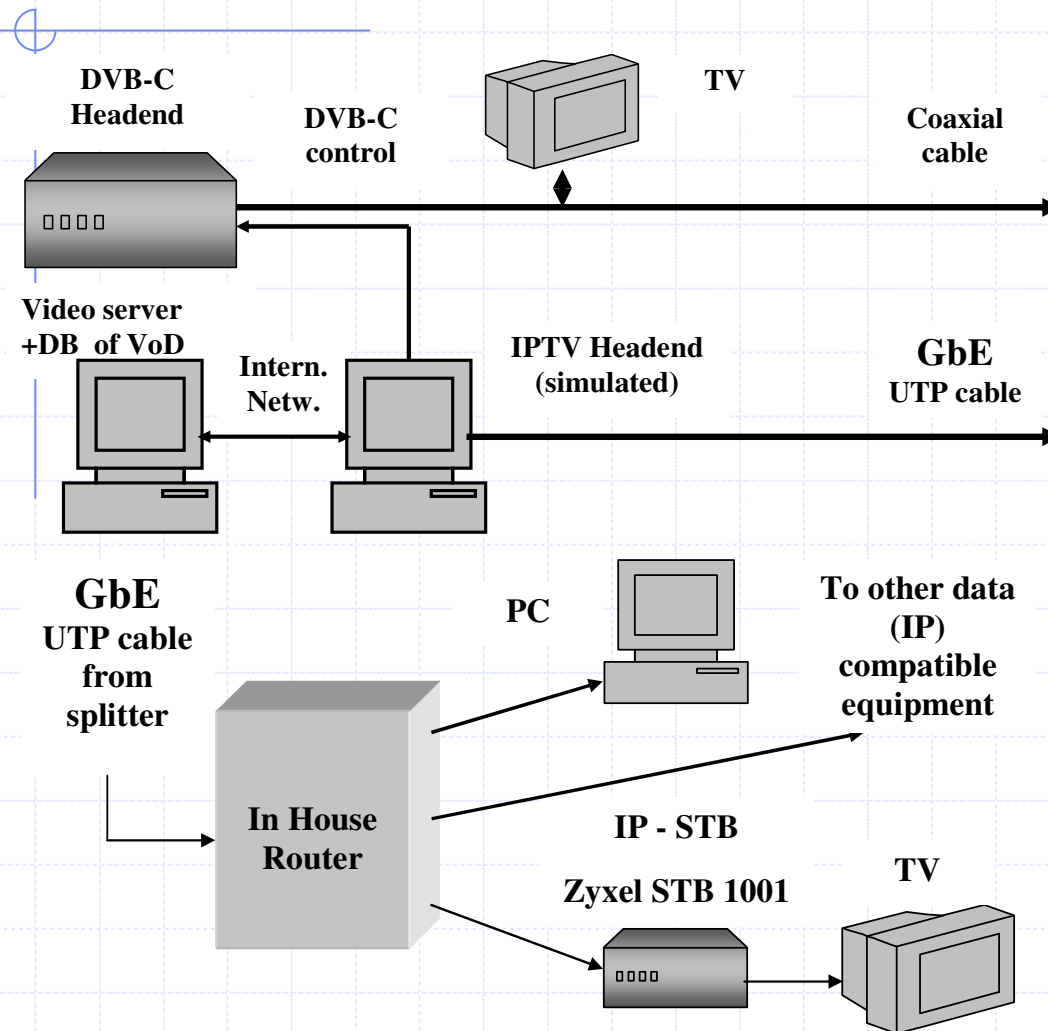
A Headend architecture based on ASI switching



Headend station based on ATM switching



Our experimental network



The Hybrid server implemented for DVB+ IPTV services

Client side for IPTV services



Evaluation using the network

- ◆ Methods of content distribution
- ◆ Data rate measurements
- ◆ Compatibility of new equipment
- ◆ Quality of Services in Hybrid networks
 - Perceived quality of each of the individual services, which in turn depends on:
 - Perceived quality of each of the service components.
 - Relationships, interactions and/or dependencies between the components.
 - Service availability and reliability.
 - System responsiveness, user-friendliness, etc.
 - Customer service



Cost Analysis for a Hybrid Solution

- ◆ It is important to make the transition from pure DVB-C to Hybrid gradually
- ◆ The cost analysis is done using the following formula

$$C_{total} = C_{HEAD} + C_{NET} + \sum_i C_{INET} + \sum_i C_{SUB}$$

C_{HEAD} - the costs of headend

C_{NET} - the costs of the entire basic network

C_{INET} - the network costs of each additional subscriber

C_{SUB} - the cost of subscriber's equipment



Costs of transition to hybrid

Percentage	Costs (\$)		
	Subscribers	Total cost (\$)	Cost/ subscriber (\$)
10	5000	1124000	224,8
20	10000	2024000	202,4
30	15000	2924000	194,93
40	20000	3824000	191,2
50	25000	4724000	188,96
60	30000	5624000	187,46
70	35000	6524000	186,4
80	40000	7424000	185,6
90	45000	8324000	184,97

Starting from 30-40% of "hybrid clients" the cost increase is negligible



Advantages of bringing IPTV in Hybrid Networks

- ◆ A large number of channels, the composition and amount of which varies depending on the rate
- ◆ Management functions in real time broadcasting (record, rewind, pause) using PVR functions (personal video recorder)
- ◆ Ability to purchase and view individually, movies from the catalog.
- ◆ TV schedule (EPG) possible for all channels
- ◆ HDTV possible in different levels and profiles with less restrictions compared with DVB



Future work

- ◆ Maintain the network up to date
- ◆ Introduction and setup of new equipment
- ◆ Explore a “cheap” version using for IPTV the DOCSIS



Conclusions

- ◆ The research is offering new alternatives to actual business models of audio-video distribution
- ◆ It will be impossible to use for triple play services the unique physical network model (wireless, cabled)
- ◆ The hybrid standard solution offers the optimal service solution
- ◆ DVB side is efficient for broadcasting services, and IPTV unveils advantages for Video on Demand services.
- ◆ The same trend is observed in audio-video business, by fusion of different services and provider companies



Thank You!