IP Multicast via IXP

Digital Audio/Video Stream Distribution
via IXP

About BIX.BG

- Started August **2009**

- Commercial operation
  January **2010**
  with 14 members
  and 4 PoPs

- Multicast Service in **2011**

- Multicast Reseller Program in **2012**

- Peak Traffic reached100 Gbps in **2014**
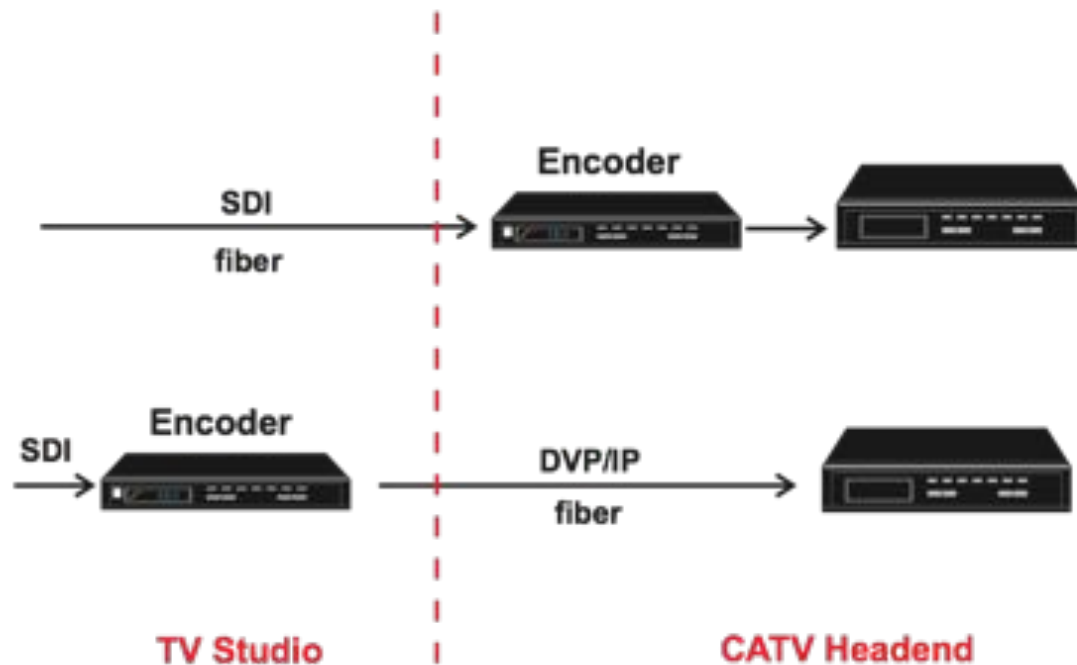
- 60 members,100 ports, 8 PoPs in **2015**

Connection between Cable TV Operators and Broadcasters
Traditional ways

Direct Connection

Satellite

BIX

Direct connection
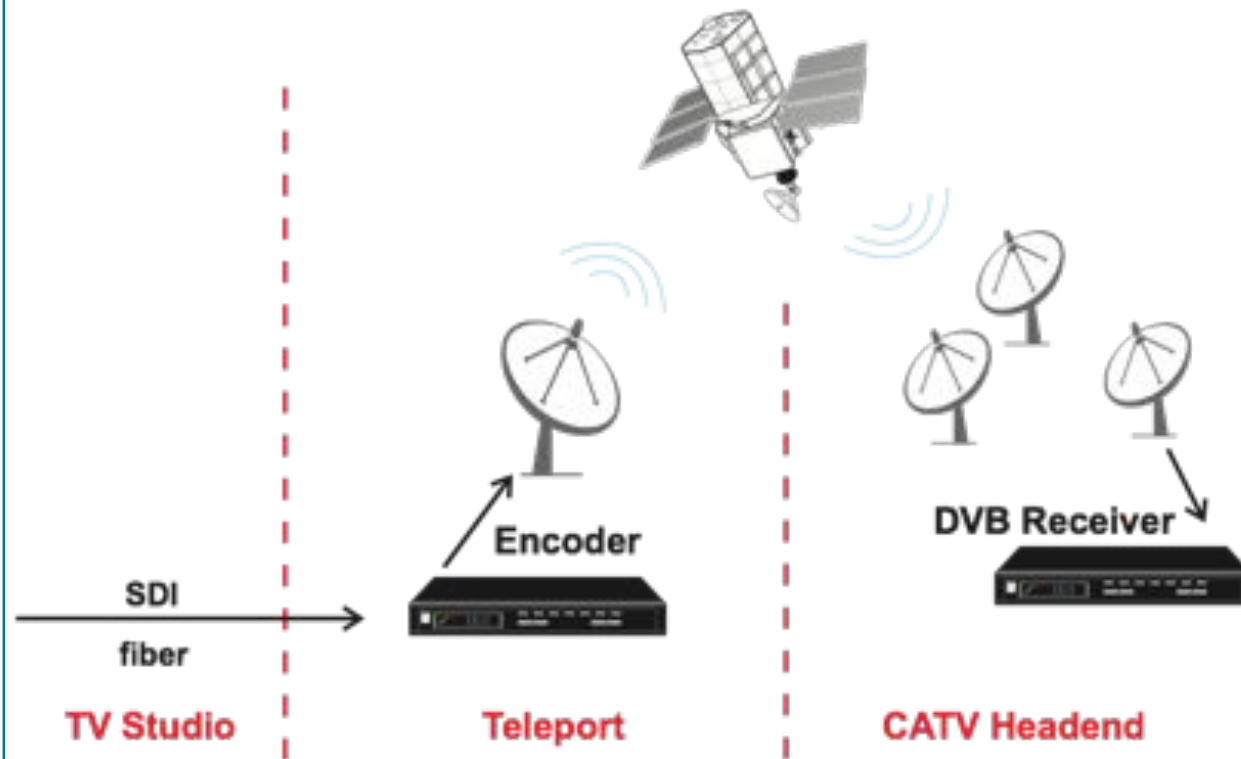# between TV Studio and CATV operator

Advantages

- Quality

- Control

Disadvantages

- Cost

- Redundancy

Satellite distribution

Advantages

- Covers large area

- Standards compliant

Disadvantages

- Cost for bandwidth

- Reliability
  (weather conditions)

- No Redundancy

SDI
fiber

TV Studio

Encoder

Teleport

DVB Receiver

CATV Headend

Super Headend
Outsourced Headend

Advantages
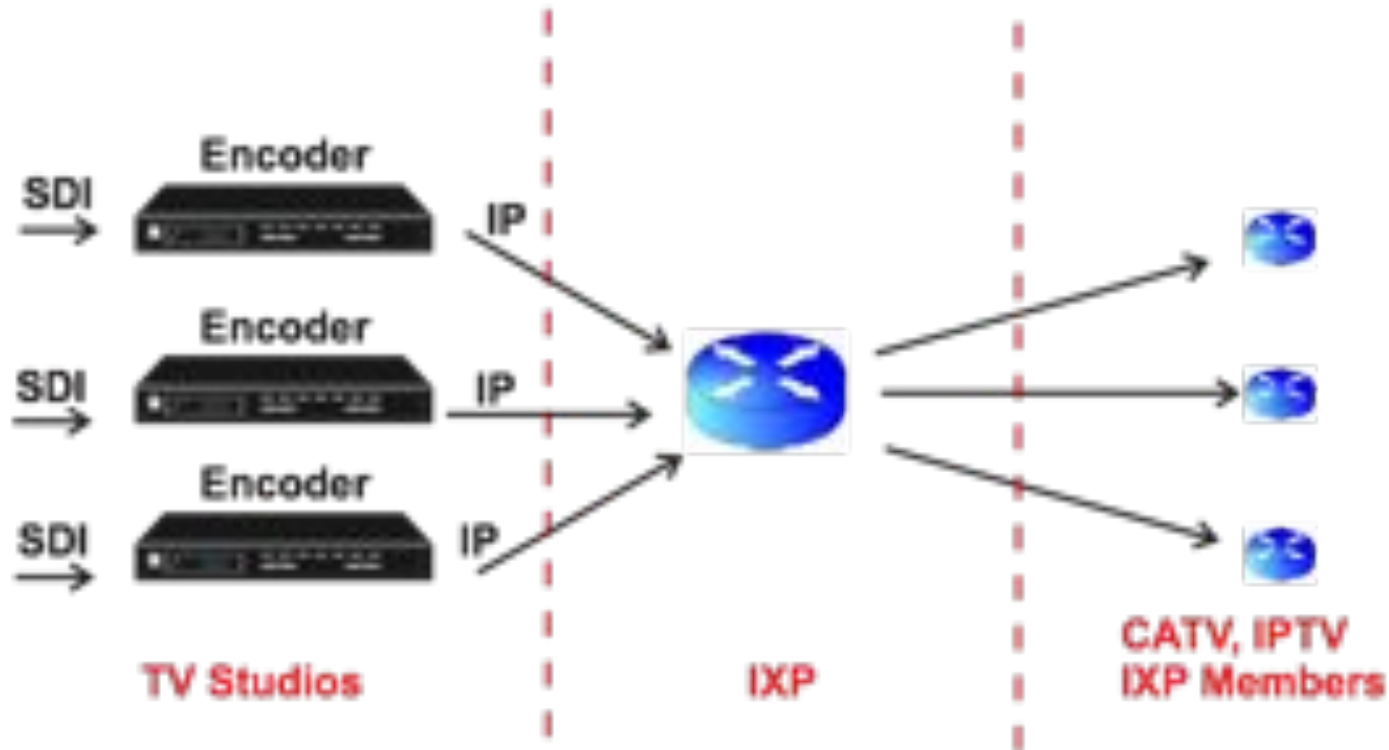
- Lower Costs (shared between participants)

Disadvantages

- Same content for all participants

Other used methods

- DVB/IP over Public Internet

- Private Circuits between CATV operators

IXP Multicast Distribution

Multicast Sources   Multicast Receivers

Peering and Multicast

	Peering	Multicast
Purpose	exchange Internet traffic	linear content delivery
	via netrual infrastructure	via netrual infrastructure
Policy	both parties agree	1. source accepts 2. receiver requests 3. IXP executes
Policy Enforcement	Routing protocol	Self-Admin Portal
Default Policy	Accept	Deny
Cost	IXP port/membership + connection	

Challenges:
Broadcasters Requirements/Limitations

- **Content Control**

- **Demarcation Point:** SDI port at their premise

  - encoder (ownership and support)

  - limited rack space in broadcaster's tech centre

Challenges:
Cable TV Operator Requirements

- **Video Codec:** MPEG2 or MPEG4 (H.264)
  MPEG2 for SD, H.264 for HD

- **Audio Codec:** MPEG1/MPEG2, AAC, AC3
  MPEG1 layer 2 @ 192 kbps

- **Bitrate:** Constant or Variable
  CBR @ 6 Mbps for SD, 8-12 Mbps for HD

- **SPTS/MPTS** Single or Multiple programs per stream / multicast group

- **Encapsulation:** UDP/RTP/HTTP
  IP/UDP with 7 DVB packets per IP datagram

- **DVB Compatibility:** clocking, TS system tables
  Re-Multiplexing in IXP

- **Multicast Routing/Switching:** IGMP, PIM, MBGP, MSDP, DVMRP
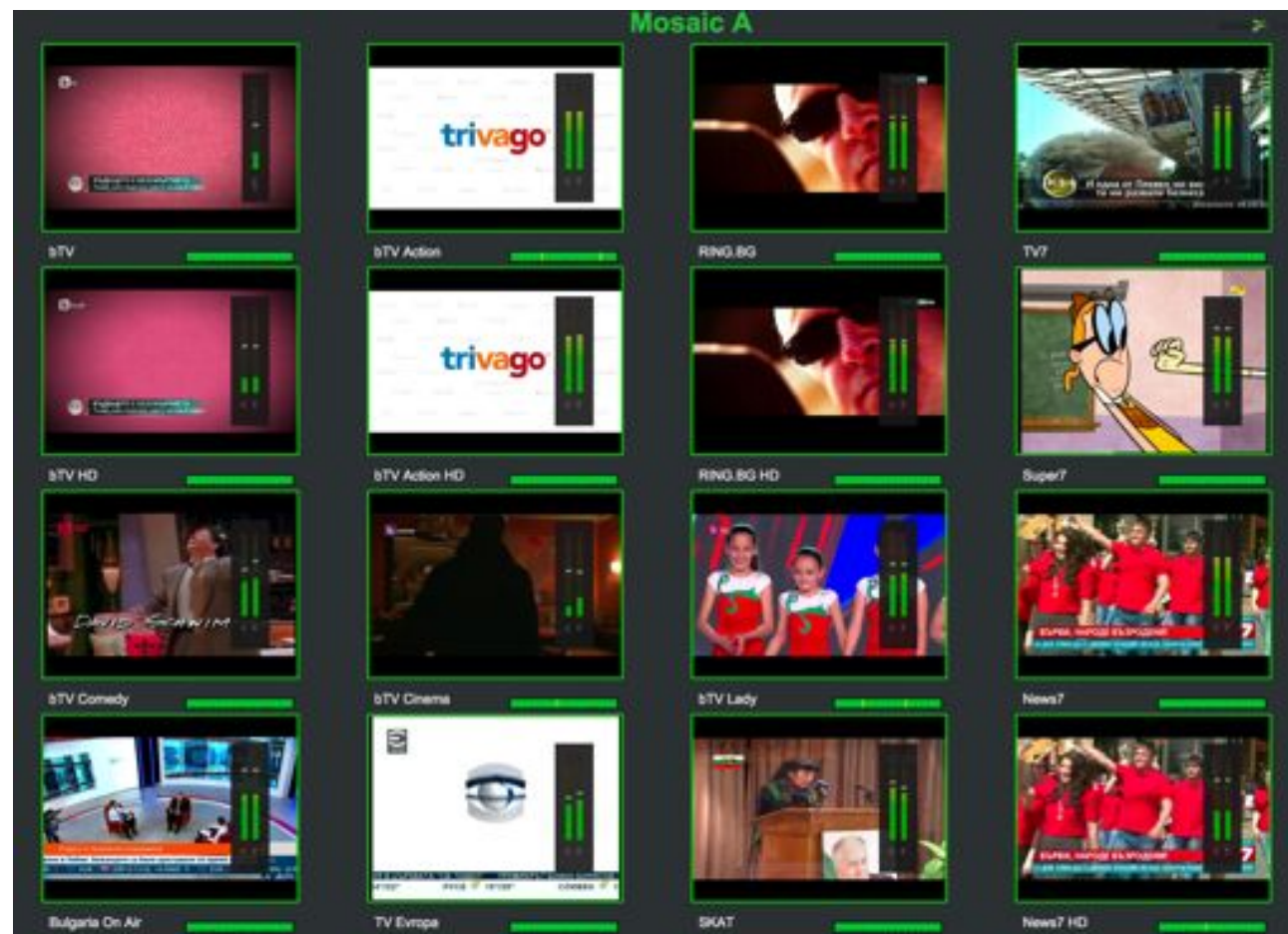 static multicast, MVR (Multicast VLAN Registration)

Troubleshooting
Most common reported problems

- Unavailable Content / Service interruption

- Choppy Video or Audio

- No Audio or Video

- Too Low or too High Audio Level

- Freeze frame

- No sync between Audio/Video

- STB X does not play content, while STB Y does

BIX
Belgarian Internet eXchange

Monitoring and Analysing

Success Story

BIX.BG daily graph updated: 24-May-2015 17:50:00 EEST

Peak Out:109.36 Gb/s — Peak In: 93.84 Gb/s — Members: 60
Average Out: 69.43 Gb/s — Average In: 54.07 Gb/s — 1GE ports: 27
Current Out: 89.43 Gb/s — Current In: 73.98 Gb/s — 10GE ports: 47

- **BIX.BG ports:**
  1 Gbe: 50
  10 Gbe: 51

- **BIX.BG Multicast:**
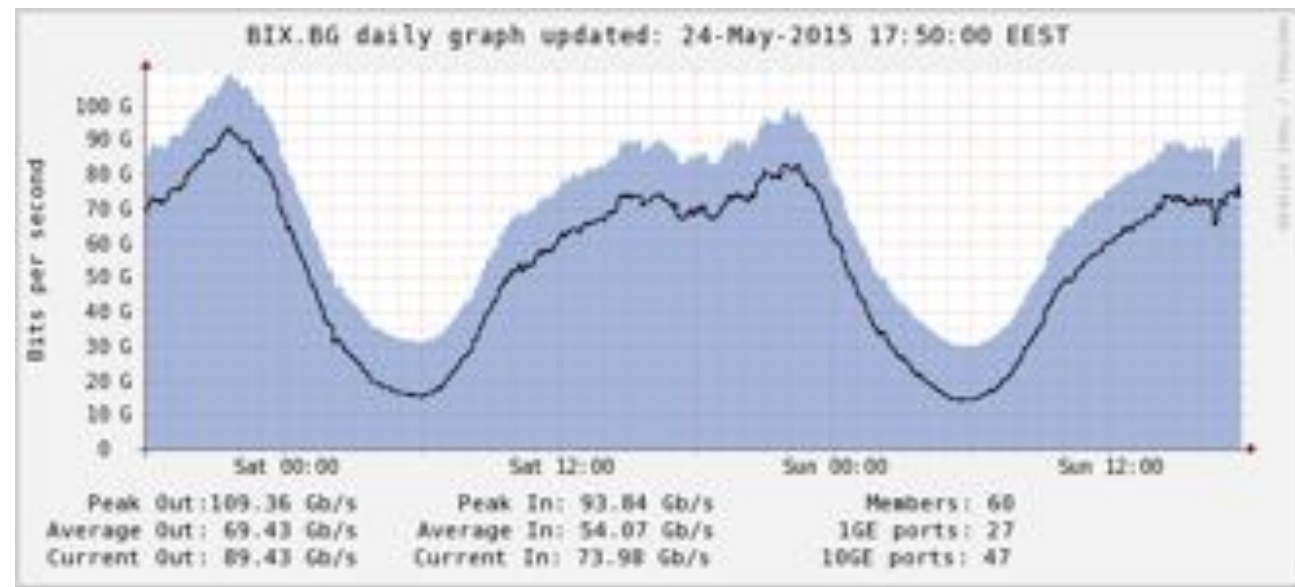 Sources: 34
  Receivers: 55
  Services(programs): 78

- **BIX.BG port by Purpose:**
  Peering only: 38
  Peering + Multicast: 47
  Multicast Only: 15

Future Developments

- **Multicast service is not suitable for:**

  - DTH (DVB-S) service providers

  - Terrestrial broadcast (DVB-T)

  - IPTV unicast / IPTV OTT

- **Possible developments:**

  - MPEG4 (H.264) for SD

  - H.265 and Ultra HD

  - HTTP live streaming (adaptive streaming) for OTT

Thank You

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