

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 reached 100 Gbps in **2014**
- 77 members, 150 ports, 7 PoPs in **2017**



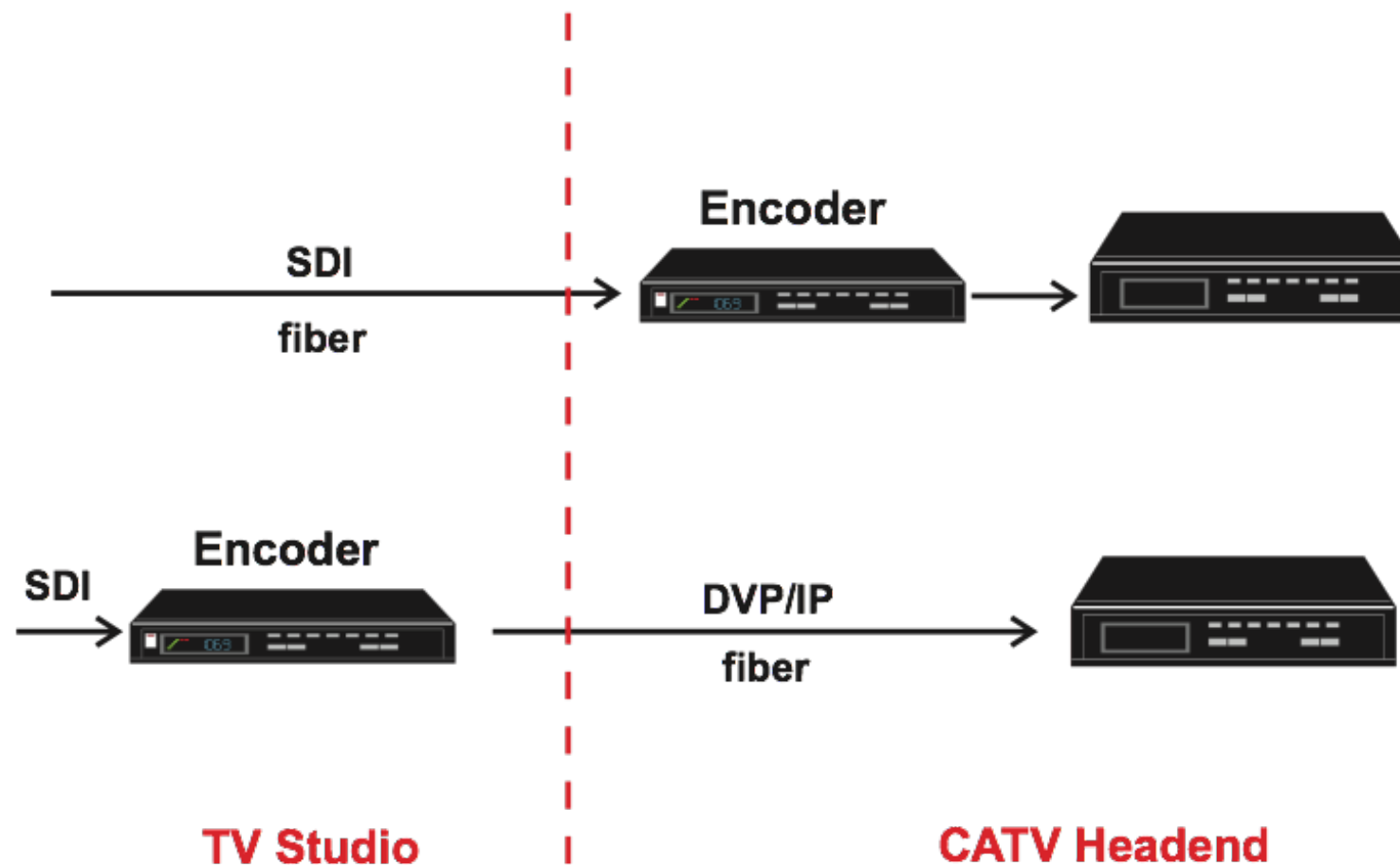
Connection between Cable TV Operators and Broadcasters

Traditional ways

Direct Connection

Satellite

Direct connection between TV Studio and CATV operator



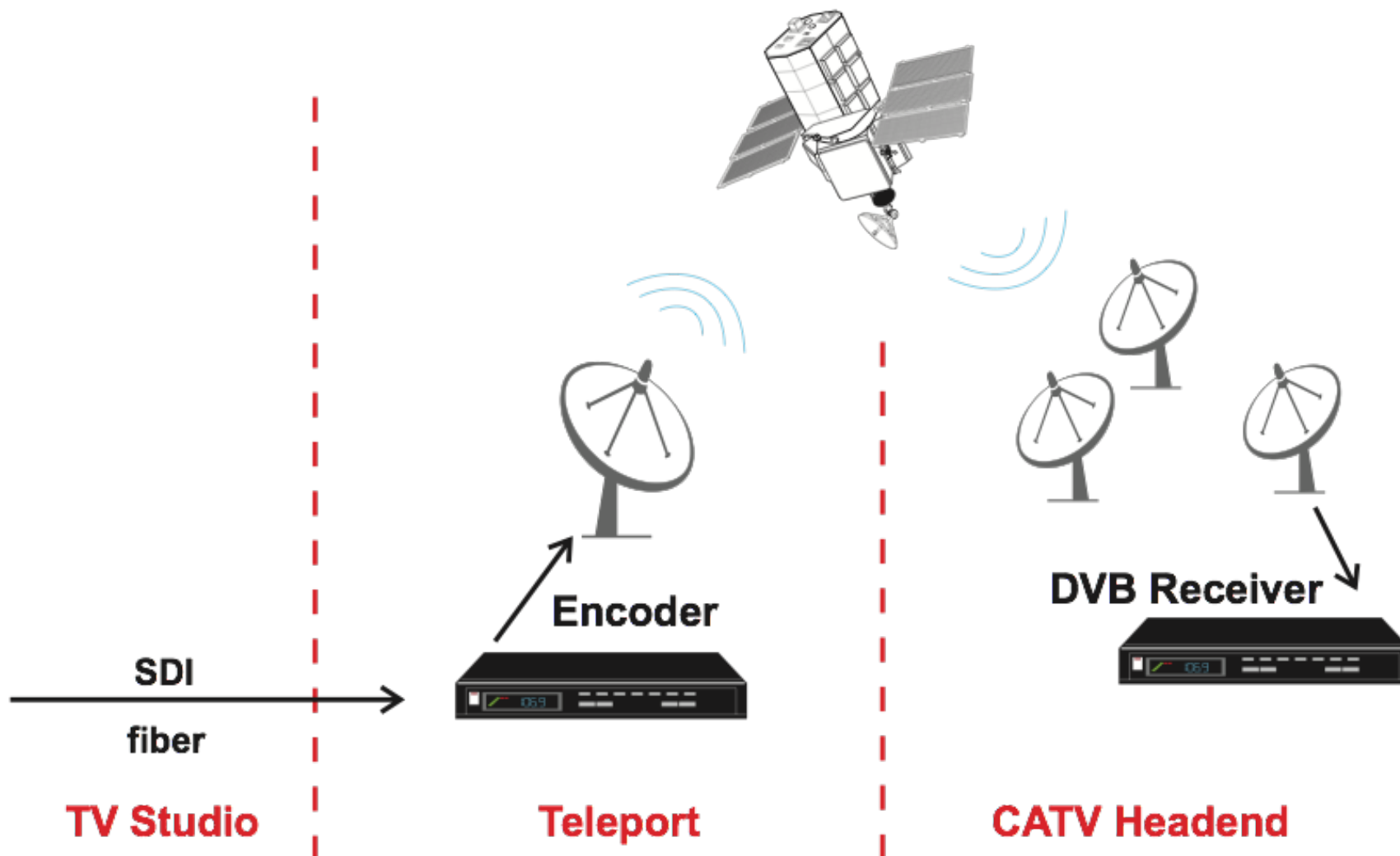
Advantages

- Quality
- Control

Disadvantages

- Cost
- Redundancy

Satellite distribution



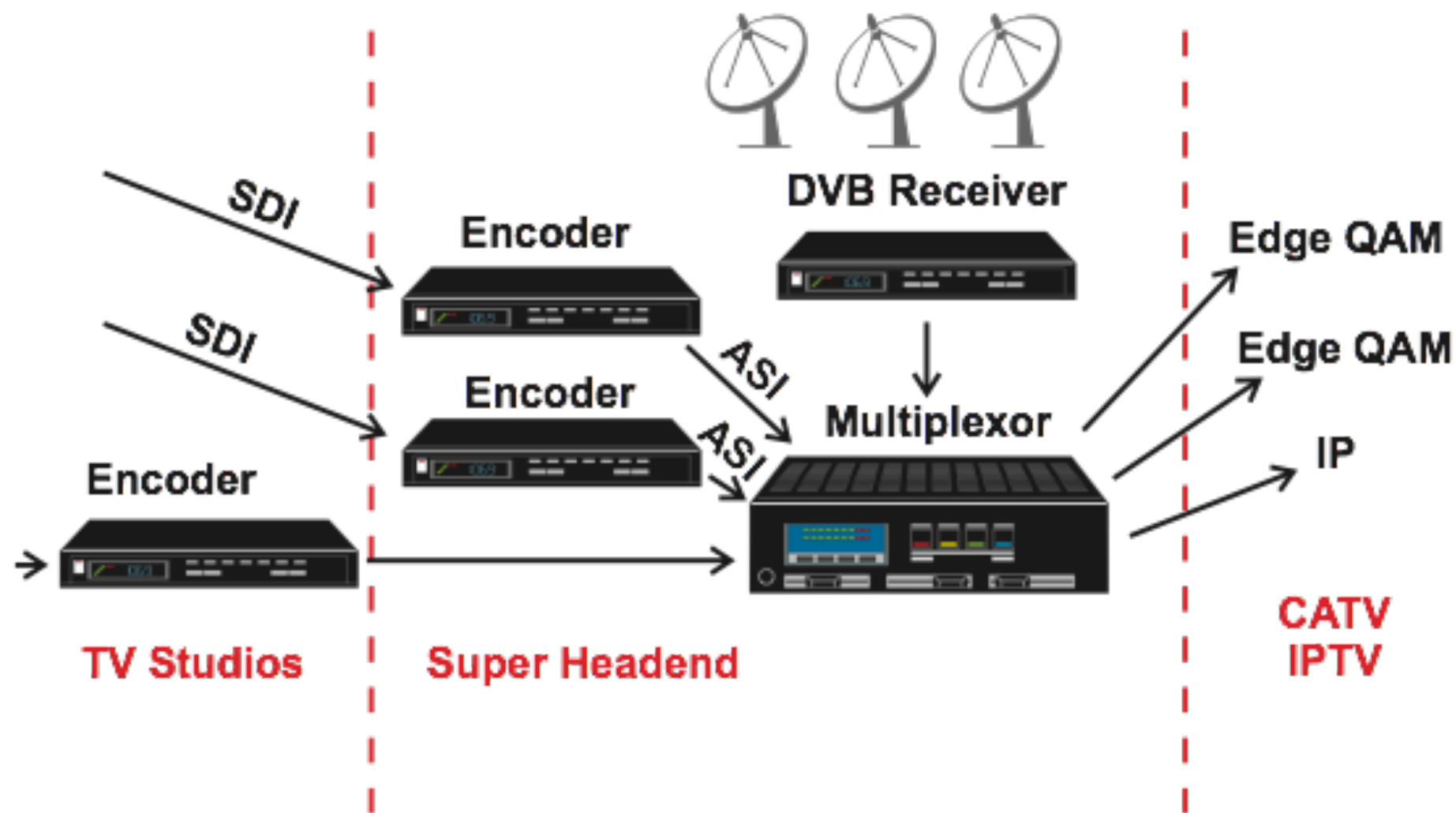
Advantages

- Covers large area
- Standards compliant

Disadvantages

- Cost for bandwidth
- Reliability (weather conditions)
- No Redundancy

Super Headend Outsourced Headend



Advantages

- Lower Costs (shared between participants)

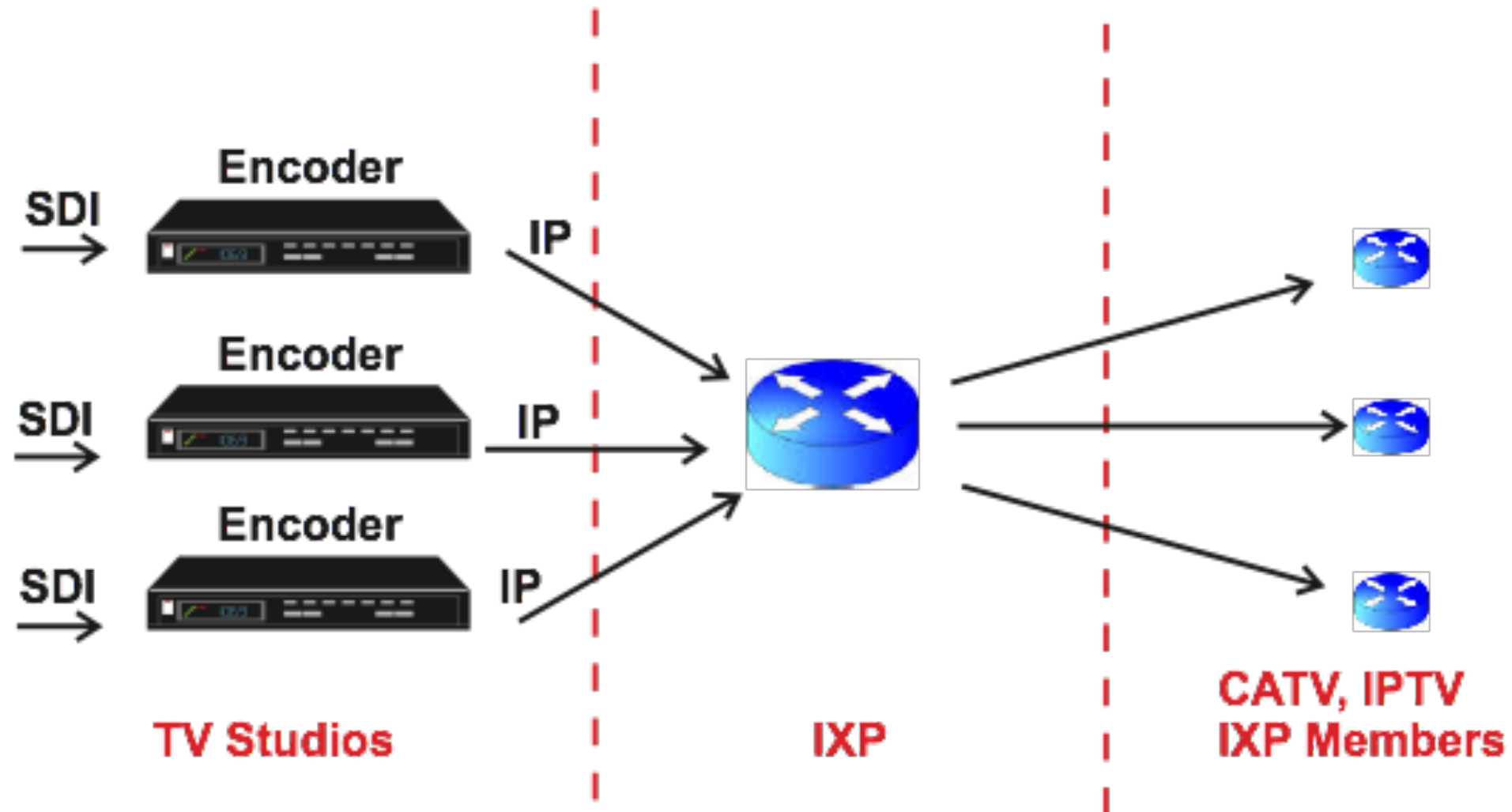
Disadvantages

- 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 neutral infrastructure	via neutral 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/MP 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)



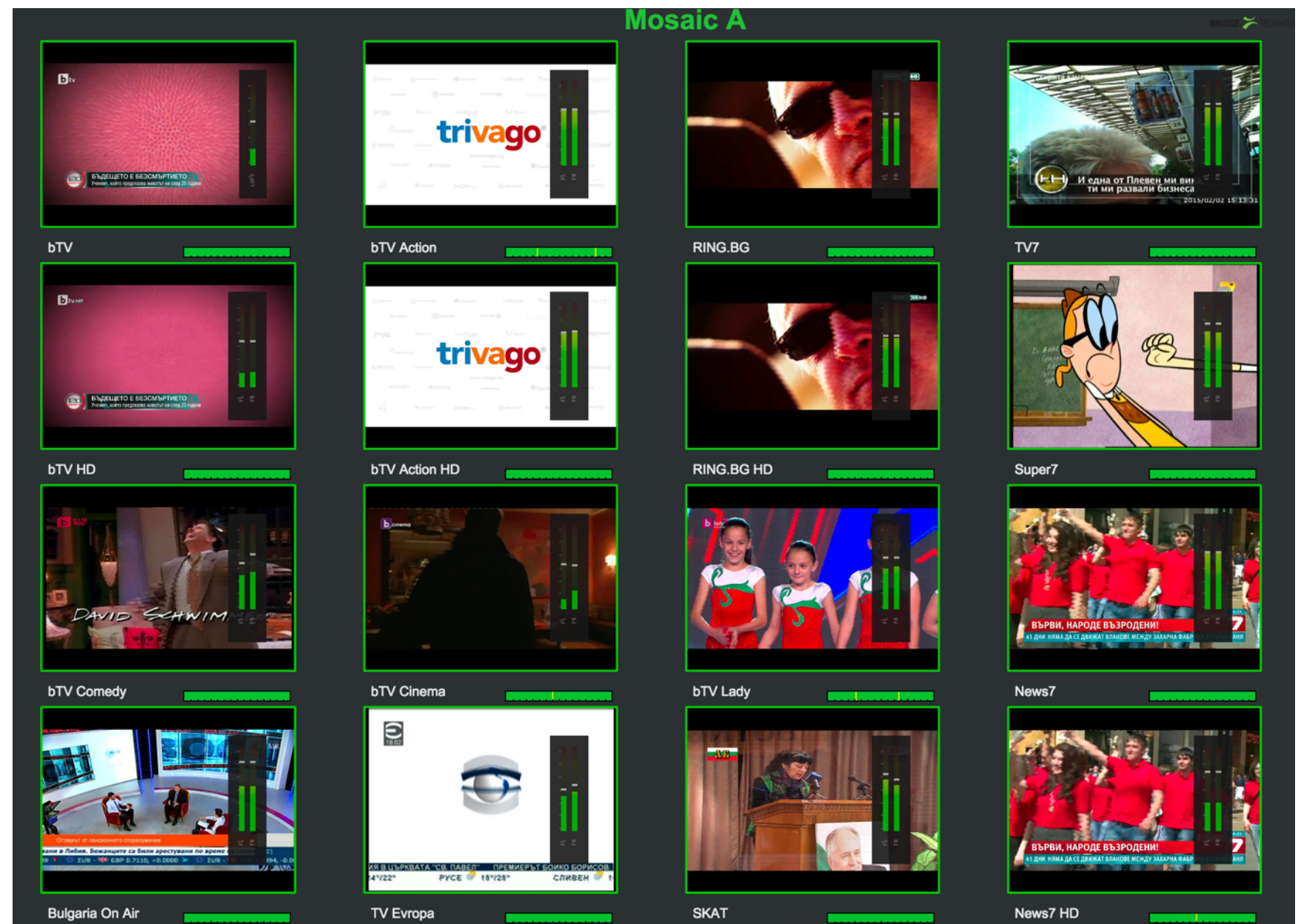
Troubleshooting

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

Monitoring and Analysing

- IP, DVB/IP
- ETSI TR 290
- Audio/Video



Success Story

- **BIX.BG ports:**

1 Gbe: 54

10 Gbe: 98

- **BIX.BG Multicast:**

Sources: 47

Receivers: 60

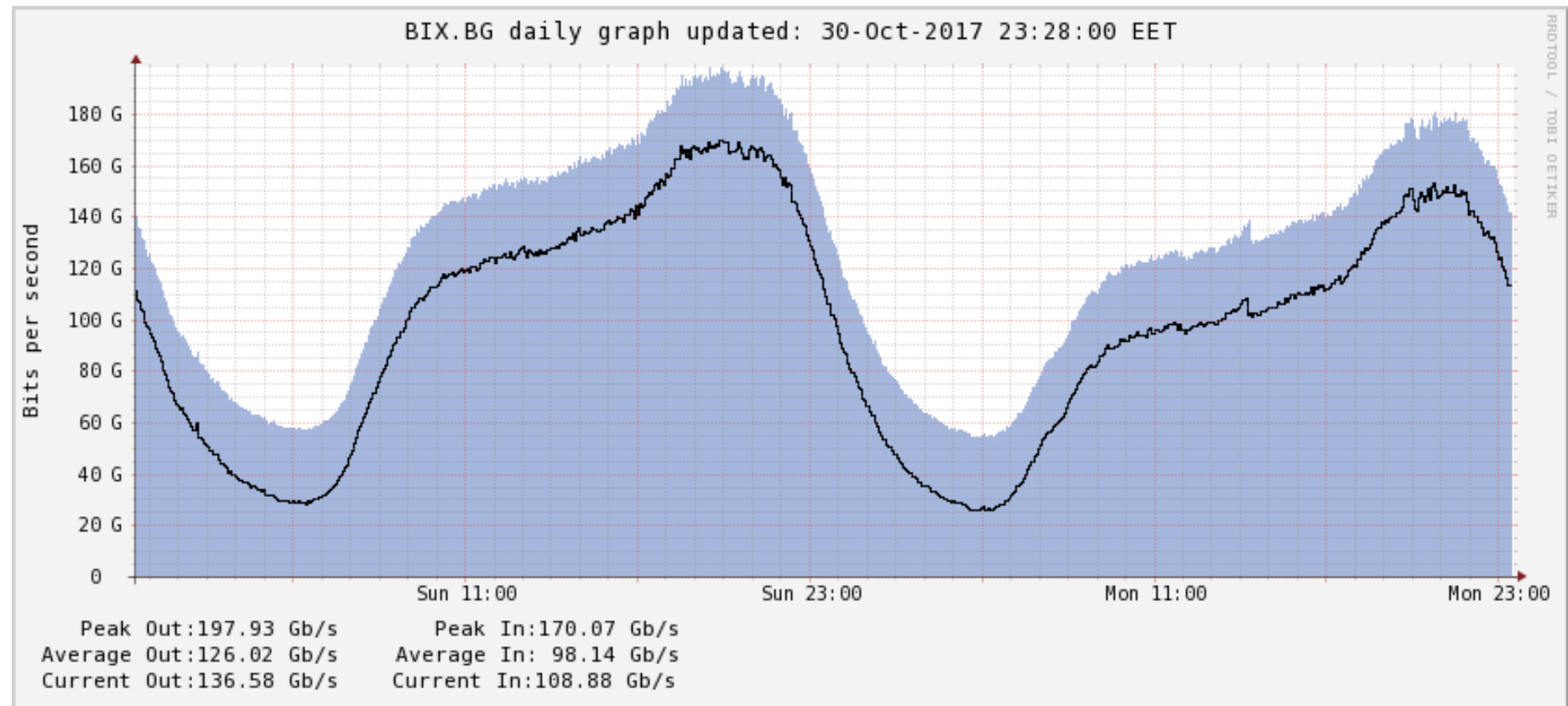
Services (programs): 134

- **BIX.BG port by Purpose:**

Peering only: 81

Peering + Multicast: 47

Multicast Only: 19



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 - in progress
 - H.265 and Ultra HD - in progress
 - HTTP live streaming (adaptive streaming) for OTT

Thank You

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