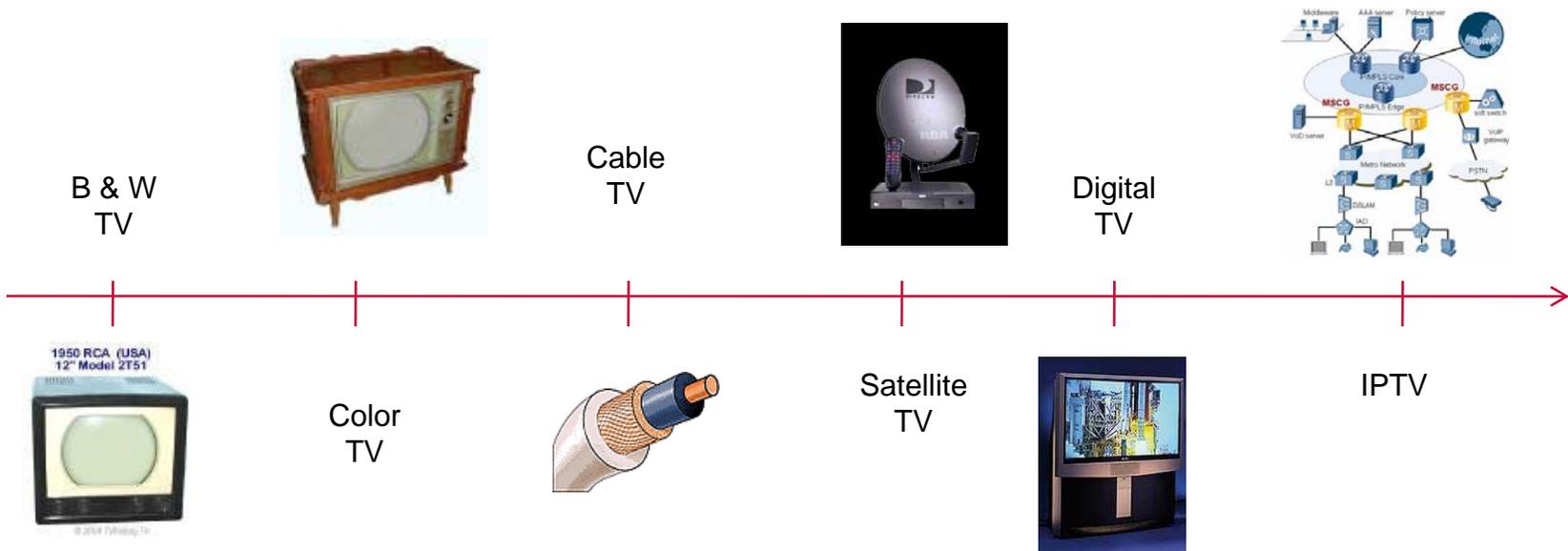


# The Transition to IPTV

John Brendle  
Ken Christensen

**SENCORE**

# Transitions in Broadcasting



Since 1951, TV professionals and broadcasters have relied on Sencore to support them at every transition in the video industry.

# Transitions in the TV Experience

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- ❖ Broadband networks enable a two-way IPTV experience
- ❖ Targeted Advertising
- ❖ TV viewing is no long “linear”
- ❖ Viewers will watch what THEY choose to watch:
  - Anywhere
  - Anyplace
  - Anytime



# Satisfaction with the IPTV Experience

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“When people see what IPTV can do, they will want it and they will gladly pay for it”

- - - - -

Issues for Broadcasters/Operators:

- Poor Quality lowers the perceived value of the broadcast
- Existing Network is built for data – not streaming video
- The increased amount of information of HDTV highlights any loss in the network.

# IPTV Monitoring And Analysis

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## Delivering on Experience Expectations and Increasing the Bottom Line

- - - - -

- Increase the quality of service to customers
- Reduce customer churn
- Reduce call volumes in service centers
- Reduce service calls
- Isolate the issues to reduce finger pointing

# General Considerations

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- Video Packets are Handled Differently than Other Network Traffic
- A Single Dropped Packet Affects Picture Quality and Viewer Experience
- Hand-Over Points Between Multiple Networks Lead to Issue Fingerprinting
- System Performance Cannot Be Measured Using Standard IT Techniques



# The 3 Pillars of Monitoring

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## ANALYSIS

- Detailed IP Packet behavior
- Protocol transport interface detail
- Protocol detail displaying
- low level ETSI TR 101 290 understanding

## OPERATIONS

- Knowledge of day-to-day service delivery
- Service Quality monitoring
- Real-Time service displaying
- Geographic understanding of service behavior
- Displaying of service delivery
- Trapping of events and alarms to relevant division systems

## STATISTICS

- Week, Month and beyond understanding of behavior
- Interface to corporate reporting systems
- Telling and Objective SLA reporting

# IPTV – What to Measure

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- IP Packet Drops
- IP Jitter
- Signal Loss



ETSI TS 102 034, “Digital Video Broadcasting (DVB); Transport of MPEG-2 Based DVB Services of IP Based Networks” states the following two important parameters in terms of quality of TV carriage over IP networks to subscriber premises:

**Section 7.2.1.1: MAXIMUM 40 ms peak-to-peak**

**Section 7.2.2.1: MAXIMUM one noticeable artifact per hour**

# IPTV Measurement Concepts

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- An Industry Standard for IPTV Monitoring
- Consists of Two Values– Delay Factor & Media Loss Rate
- Defines the Performance of a Network Segment



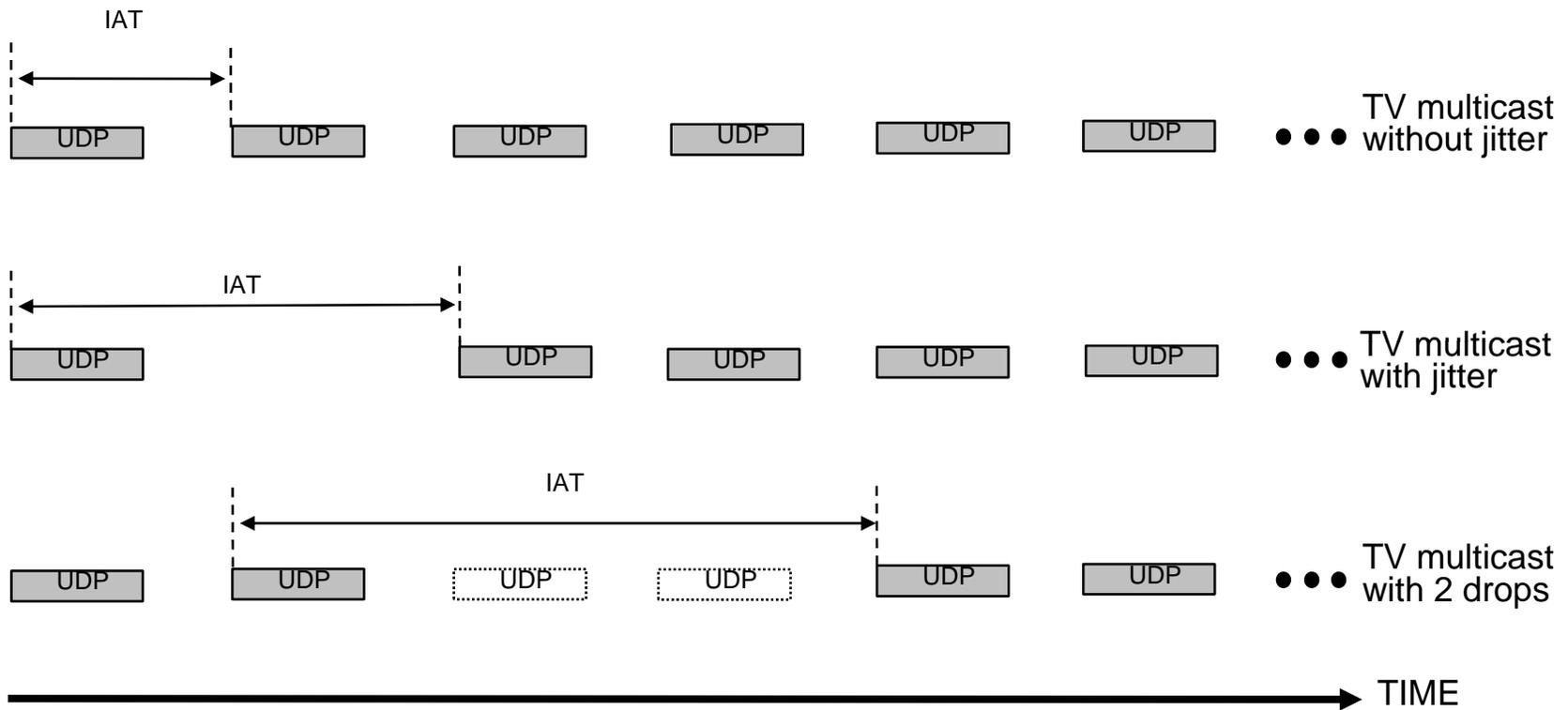
## **Delay Factor**

Maximum Time Between IP Frames, Typically Measured Over 1 Second

## **Media Loss Rate**

Count of Lost Transport Stream Packets Over Same Measurement Period

# Packet Jitter and Packet Drops



- **IAT – Inter Arrival Time:** Time Measured Between Neighboring IP frames
- The variation of IAT is a measure of packet jitter
- The peak value of IAT is of interest when measuring jitter

# Common Network Problems

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## JITTER

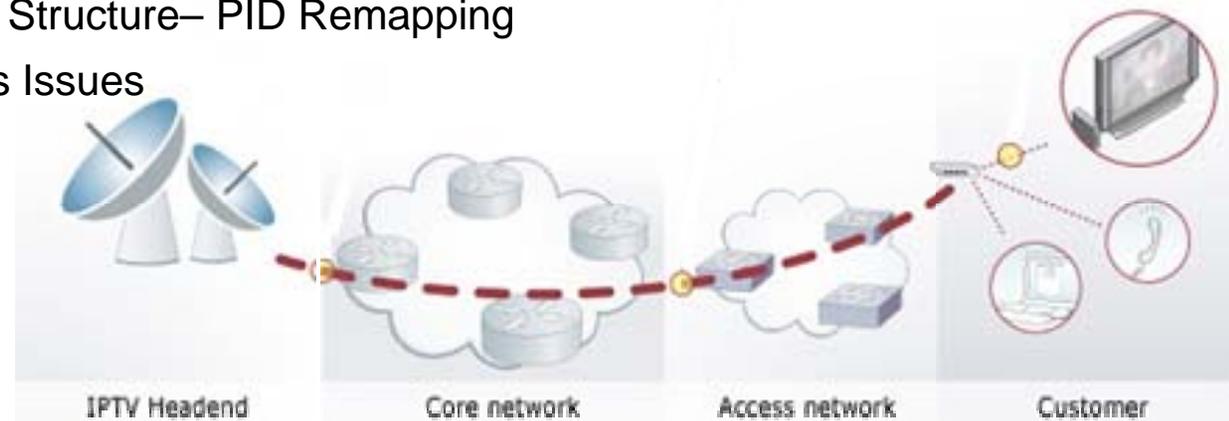
- ❶ Routers and Switches Not Configured for Proper Prioritization
- ❷ DSL Line Noise Leading to Queuing in DSLAMs

## PACKET DROPS

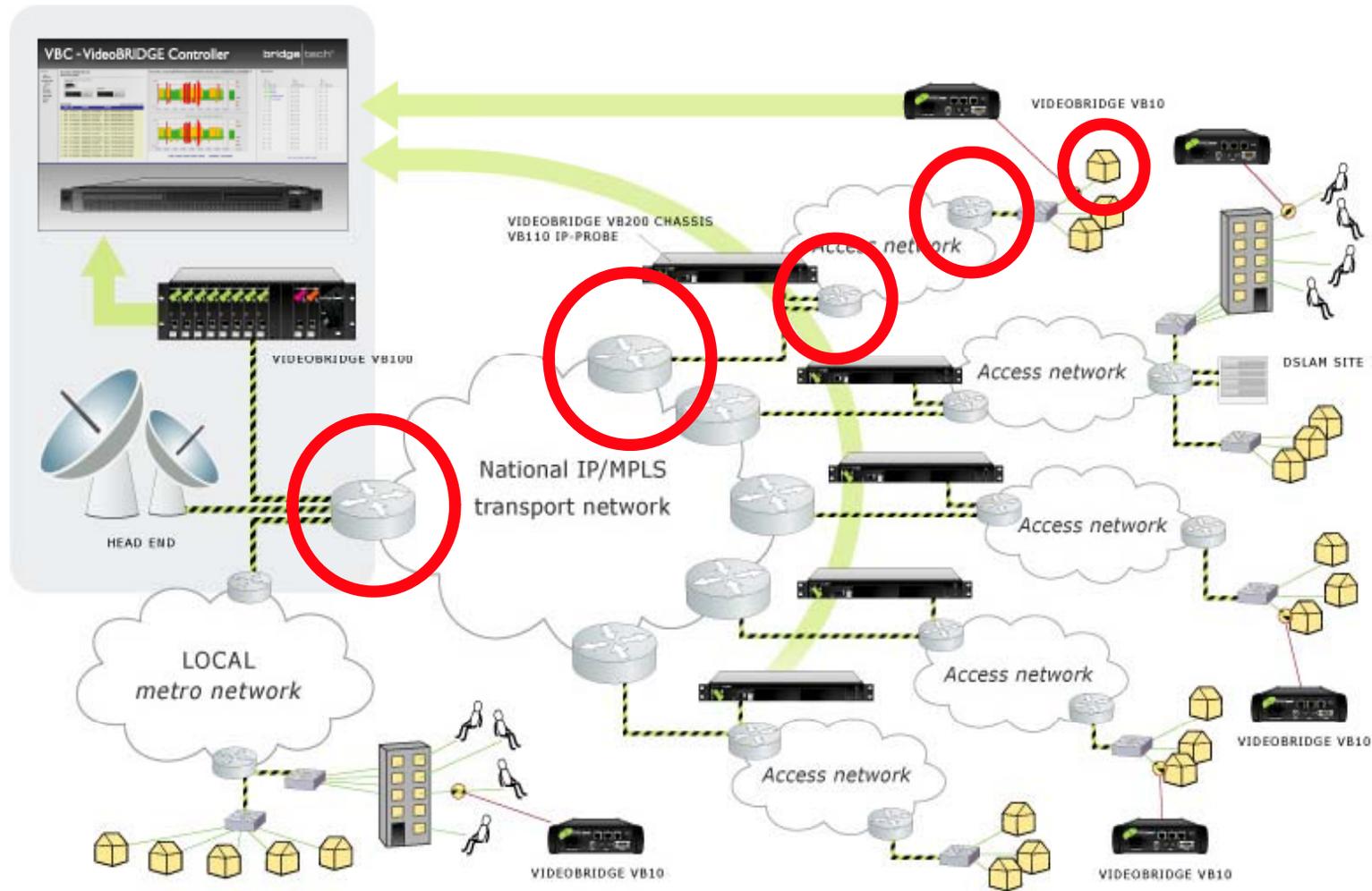
- ❶ Packet Re-Ordering Due to QoS Settings
- ❷ Network Traffic Loading During Peak Usage Periods

## GENERAL NETWORK ISSUES

- ❶ Faults in Incoming Satellite Signal and Weather Outages
- ❷ Changes in Signal Structure– PID Remapping
- ❸ Conditional Access Issues

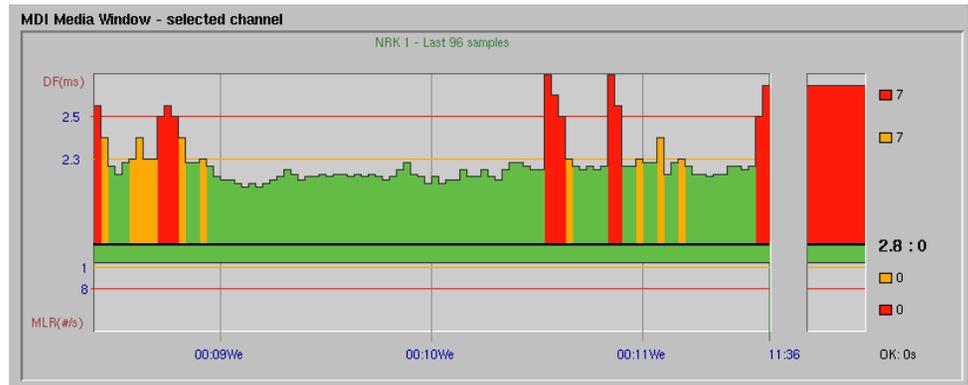
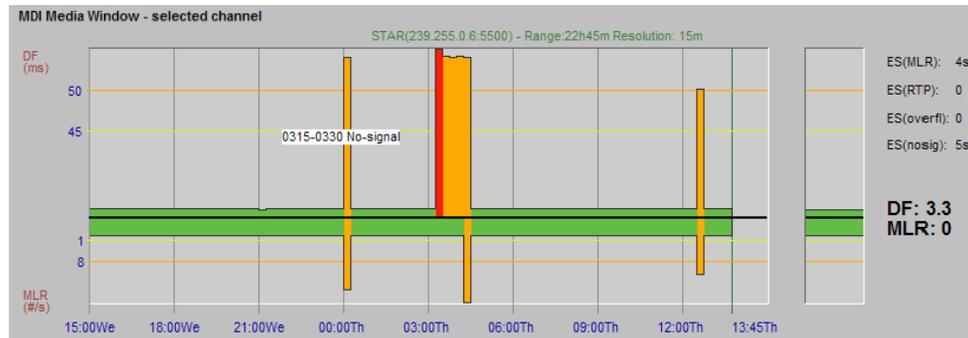


# Problem Monitoring Throughout the Network



# Adding the Time Dimension to MDI

- Time Helps Uncover IPTV Issues Not Found By “IP Methods”
- Normalize MDI Values Over Time to Reduce “False Alarms”
- Adding Time to MDI Enables Comparative Analysis Between Multiple Points



# Using MDI to Troubleshoot Problems

- Identify trend patterns:



Notice band of less packet loss after midnight

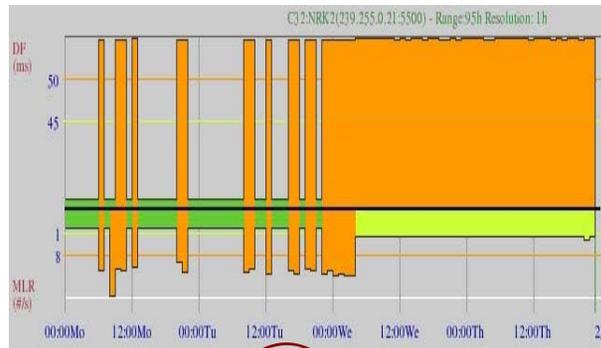
- Identify repeating faults



Packet loss and jitter every 24 hour for 1 hour

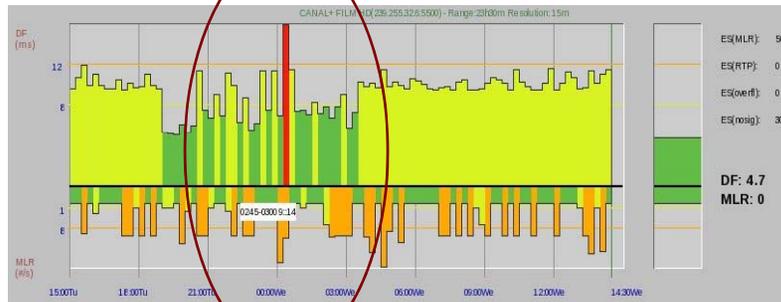
# Using MDI to Troubleshoot Problems

- Progressive fault development



CAM descrambler module failure

- Duration of fault



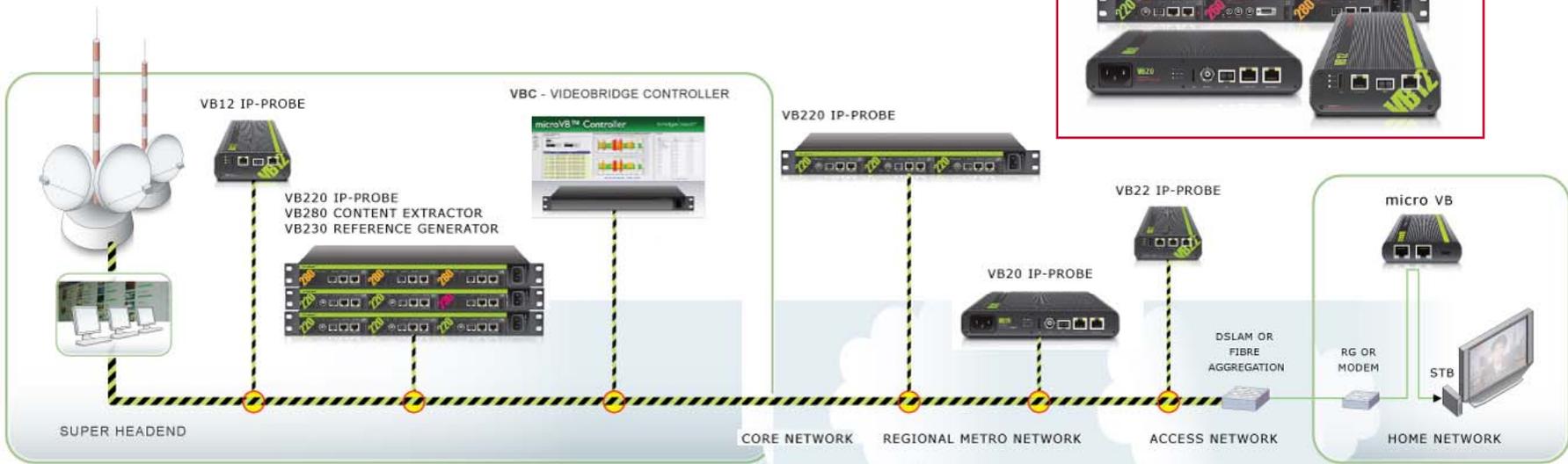
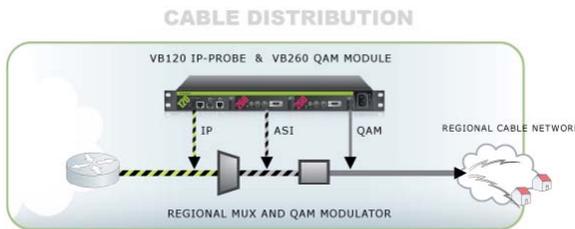
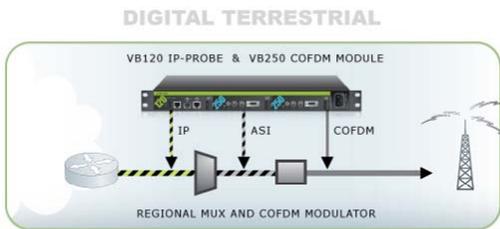
MDI over last 24 hours

ES(nosig)=56 seconds  
ES(MLR)=30 seconds

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**THE MOST  
COMPREHENSIVE  
FAMILY OF IPTV  
MEASUREMENT  
AND ANALYSIS  
PRODUCTS IN  
THE WORLD**



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## For More Information:

Thank You!

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