REAL TIME VISIBILITY OF IPTV SUBSCRIBER EXPERIENCE AND VIEWING ACTIVITY

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Outline

• STB-centric performance management?
• Measuring IPTV subscriber experience – how and why?
• Viewing activity – ratings in real time
• Agents in Set Top Boxes
• IPTV Performance Management Architecture
• Summary – implementation status and benefits
• Intelligent performance monitoring agents in STB’s measure subscriber QoE, viewing statistics....
• STB agents “push” compact reports to management middleware
• Management middleware collects and reports real time performance data
IPTV SERVICE MODEL

Multicast IP network

Channel

GPON or DSL

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CHANNEL PROBLEM

Multicast IP network

GPON or DSL

Channel
ROUTER/MSAN PROBLEM

Multicast IP network

GPON or DSL

Channel

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BANDWIDTH PROBLEM

Channel

Multicast IP network

GPON or DSL

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STB-CENTRIC PERFORMANCE MANAGEMENT

- STB agents measure quality and viewing activity
- Data incorporated into report supports real time correlation
- Management middleware correlates arriving data in real time, identifies problems and reports real time performance data
WHY STB-BASED AGENTS?

• Provides near real-time visibility of QoE
  – data is reported within minutes
• Proactively detects problems affecting service
  – Middleware correlates arriving reports as they arrive
• Provides feedback from customer premise
  – Network probes don’t see into the customer home
• More scalable and less expensive than network based probes
MEASURING SUBSCRIBER EXPERIENCE

• Goal
  – Measure IPTV service quality delivered to each subscriber
  – Determine impact of significant video encoding or transmission problems on decoded video
  – Identify source of problems

• Advantages of STB based approach
  – Proactive – see problems quickly
  – Correlation of STB reports can identify wide range common factors in real time
  – Can detect outages (i.e. absence of reports)
MEASURING VIEWING ACTIVITY

• Goal
  – Identify channel watched by subscriber, track time on channel
  – Aggregate to give real time visibility of viewers per channel

• Advantages of STB based approach
  – Covers entire subscriber base (not sampled)
  – Data available in near real time
  – Provides data on less watched channels (which sampling approaches can’t)
AGENTS IN SET TOP BOXES

Low complexity IPTV performance monitoring agent (~5-10% of STB CPU)
STB AGENT ARCHITECTURE

- MPEG Demux
- I/B/P frame detection
- Content Analysis
- MPEG TR101290 Metrics
- Blank, Frozen Image Detection
- Playout Buffer Emulator
- Per Frame Quality
- Codec/Bandwidth Model
- Motion Blockiness Model
- Report Generation
- Perceptual Quality Model

SQlive

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STB REPORT

Interval
-Cross-channel metrics, overall experience
- Correlation tags

Per-Channel
-detailed metrics, QoE scores, Video MOS
-MPEG transport metrics...
-Time spent on channel
MIDDLEWARE

Problem: Types
- Packet Loss
- Congestion
- Delay

Problems: Correlation
- Core Network
- Access Network
- Customer Premise

Alerts
- User Impact
- Alert Rate

5m 15m 1h 6hr 24hr 7d

Top Channels
Channel 10

Lowest Quality Channels
Channel 10

Web GUI
Dashboards

Reporting
Correlation
Report Collection

Pre-correlated data in database

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MIDDLEWARE – IDENTIFYING PROBLEMS

Correlate by channel and by correlation tags to identify type and scope of problems
MIDDLEWARE – VIEWING STATISTICS

Current viewers per channel

Subscriber A
Subscriber B
Subscriber C
Subscriber D

Correlate by channel and by correlation tags to identify type and scope of problems
**MIDDLEWARE – VIEWING STATISTICS**

- See viewing activity within (typically) 10-15 minutes
- Statistics span all channels being watched (down to 1 subscriber)
- Statistics are anonymized but retains correlation data
- Provide feedback to advertisers on viewing activity and quality
- Granularity sufficient for ad tracking
IPTV PERFORMANCE MANAGEMENT ARCHITECTURE

Middleware Functions
- Collection/Correlation
- Agent Configuration

Channel

GPON or DSL
Agent in STB or ONU

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RELATED STANDARDS ACTIVITIES

• ITU-T
  – IPTV QoE Measurement – ITU-T SG12 P.NAMS
  – Performance Management Reporting Models – ITU-T P.IPTV-PMR

• ATIS IIF QOSM Task Force
  – ATIS 0800008 QoS Metrics for Linear Broadcast

• Industry Forums
  – Broadband Forum
  – VSF
SUMMARY

• STB-centric performance management
  – Measuring IPTV subscriber experience
  – Measuring viewing activity
  – Agents in Set Top Boxes
  – IPTV Performance Management Architecture

• Implementation Status
  – Early commercial deployment
  – Integrated into several major STB product ranges

• Questions?