Optimizing Networks for Delivering IPTV

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IPTV Must be a Differentiated Service

“Way better IPTV experience” essential
Service innovation key
User-centricity essential
Me-too BTV strategy will not ensure competitiveness
Bar set high by Cable companies, DBS vendors

“Way Better” TV

What’s Hot portals

Content portal

DVR control from Mobile

Integrated messaging
but a Service Transformation . . .

New services, content types, expectations (always on)
Increased competition dictates service innovation/velocity
Video has transformed the network requirements
. . . Requiring a Network Transformation

1. ATM to Ethernet
2. Session-Based to Connectionless
3. ADSL to Multi-access Multi-technology

**Optimal Cost Structure**

**Plug and Play, Flexibility**

**Service Reach**

**Distributed Functions, Policies**

Integrated, Flow-Through Subscriber, Network and Service Management

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**Early and Present Day ATM-Based Broadband Aggregation**
- ATM DSLAMs: Unintelligent Layer 1 aggregation; low-speed ATM uplinks; mostly CO-based
- Complex, fixed connections: PPP-based; bound to DSL CPE in the home; provisioning cost high
- Centralized B-FAS: Optimized for best effort internet access; lack of scalable routing and QoS; typical OC-12 handoff to IP core
- Lack of network resiliency: Outages tolerated; minimal financial repercussions

**Next-Generation Ethernet and IP-Based Broadband Aggregation**
- IP DSLAMs: Intelligent aggregation with support for multicast; Gigabit Ethernet uplinks; increasingly RT-based
- Simple, flexible connections: DHCP based; independent of device; user based; provisioning cost low
- Distributed broadband aggregation routers: Optimized for video and other QoS-sensitive services; highly scalable; 10 Gige handoff to IP/MPLS core
- Highly available network: Little to no tolerance of service interruptions; risk of churn if reliability metrics aren’t met

Source: Network Transformation Process for Triple Play, Yankee Group, 2005
Sophistication and Scale of IPTV Networks

- Flawless orchestration of thousands of “moving parts”
- Tens of thousands of sophisticated policies enforced across different nodes
- Streamlined, integrated element, policy, service and subscriber management
- Service delivery to the most economic point (multi-access/multi-technology)
Bandwidth Scaling Requirements

**Bandwidth Requirements**

- HD video, service innovation key to differentiation
- Bandwidth requirements driven by unicast video
- 25’s to 50’s of Gb/s required per access node
  - ATM DSLAM 10Gb/s not scaling for FTTx
- 100’s of Gb/s required per aggregation node
  - BRAS average 40-50Gb/s capacity inadequate
  - BRAS proliferation results in exponential cost structure
- Ethernet enables **new economics**

### Downstream and Upstream

<table>
<thead>
<tr>
<th>Service</th>
<th>Downstream</th>
<th>Upstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 HDTV, 2 SDTV</td>
<td>16 Mb/s</td>
<td>50 Kb/s</td>
</tr>
<tr>
<td>1 Gaming channel</td>
<td>256 Kb/s</td>
<td>256 Kb/s</td>
</tr>
<tr>
<td>2 Voice calls &amp; Visio</td>
<td>220 Kb/s</td>
<td>220 Kb/s</td>
</tr>
<tr>
<td>High Speed Internet</td>
<td>3 Mb/s</td>
<td>512 Kb/s</td>
</tr>
<tr>
<td><strong>Total (Example)</strong></td>
<td><strong>20 Mb/s</strong></td>
<td><strong>1 Mb/s</strong></td>
</tr>
</tbody>
</table>

**Scaling of unicast Video** means 100’s of GE capacity per CO with services & policy enforcement at wire speed
Requirements for Triple Play Service Delivery

- Providing service flexibility/versatility
  - “Right sized” infrastructure with scale across all dimension
  - Distributed policy enforcement and services for constant optimization
  - Centralized/streamlined management
- Enabling “Always On” services
  - High availability infrastructure
  - Distributed security
- Optimizing the cost structure
  - Scaling the bandwidth
  - Extending service reach
  - Operational efficiency
- Integrated management
Distribution of Service Intelligence

- Distributed/Optimized Subscriber Policy Enforcement
- Per-service, per-node policy enforcement

Optimal implementation through distributed service and policy enforcement

End-to-end service capabilities maximize flexibility, minimize risk

No operational or technology “lock-in” as services/traffic patterns evolve
Flexibility & Optimized Content Delivery

25 top channels plus specific requested channels

100 popular channels plus specific requested channels

BTV: Maximized flexibility through end-end multicast support – multicast adapts traffic replication and dynamically optimizes multicasting mechanisms to adapt to new, changing viewing patterns

Unicast Video (N-DVR, VOD) content insertion point optimized for actual viewing patterns
Enabling “Always On, Always Available” IPTV

Highly available, Integrated subscriber and services control

Purpose-built portfolio must exceed stringent high-availability requirements for Triple Play services and offers optimal system characteristics with no single point of failure

Non-stop service provides millisecond service recovery for link, path, and node failures

Non-stop routing mechanisms ensure millisecond recovery times for switchover from primary to secondary route processor for non-stop service Delivery

Secure, Resilient VPLS Infrastructure

BSAN

BSA

BSR

SSC
Integrated Management for Triple Play

Personalized and Interactive User Experience
- Self-service portals
- Service-driven QoS
- Try-and-buy weekend specials
- Subscriber admission control

Innovative and Profitable Services
- Account usage
- Prevent abuse
- Control usage
- On-demand Services
- Flow-through OSS integration

Effective, Resilient and Scalable Control

Operational Excellence
- SUBSCRIBER AND USAGE CONTROL
- Service and Revenue Control
- Network Infrastructure Control

Centralized policy management
Flow-through OSS integration
On-demand Services
Prevent abuse
Control usage
Account usage

Operational Excellence
- Try-and-buy weekend specials
- Subscriber admission control
- Distributed policy enforcement

Self-service portals
Service-driven QoS
Try-and-buy weekend specials
Subscriber admission control

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"......The results have important implications for service providers. The first and most obvious is that different approaches to building broadband aggregation networks for the triple play have an important impact on the bottom line.

The second is that a mere upgrade to traditional CBA architecture leveraging mainstay ESB and B-RAS platforms will not yield a profitable triple-play business model.

Last, it’s important to evaluate the DEA approach, which derives its financial advantage from its ability to optimize broadband aggregation networks for triple-play services...."
Optimizing IPTV: Key requirements

- Flexible, versatile service delivery architecture
  - Rich, dependable services available end-to-end
  - Multidimensional scale, uncompromised performance
  - Optimizes with new traffic patterns, services

- Non-stop service delivery = way better user experience
  - Enabling always on, always available services
  - Comprehensive approach to non-stop service delivery
  - Control, forwarding and management plane resiliency

- Optimized cost structure
  - Ensures service delivery to the most economic point
  - Maximizes the returns on network assets
  - Streamlined, integrated management