

NGN: Bigger and Better!

10G meets Network Intelligence

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23 October 2007

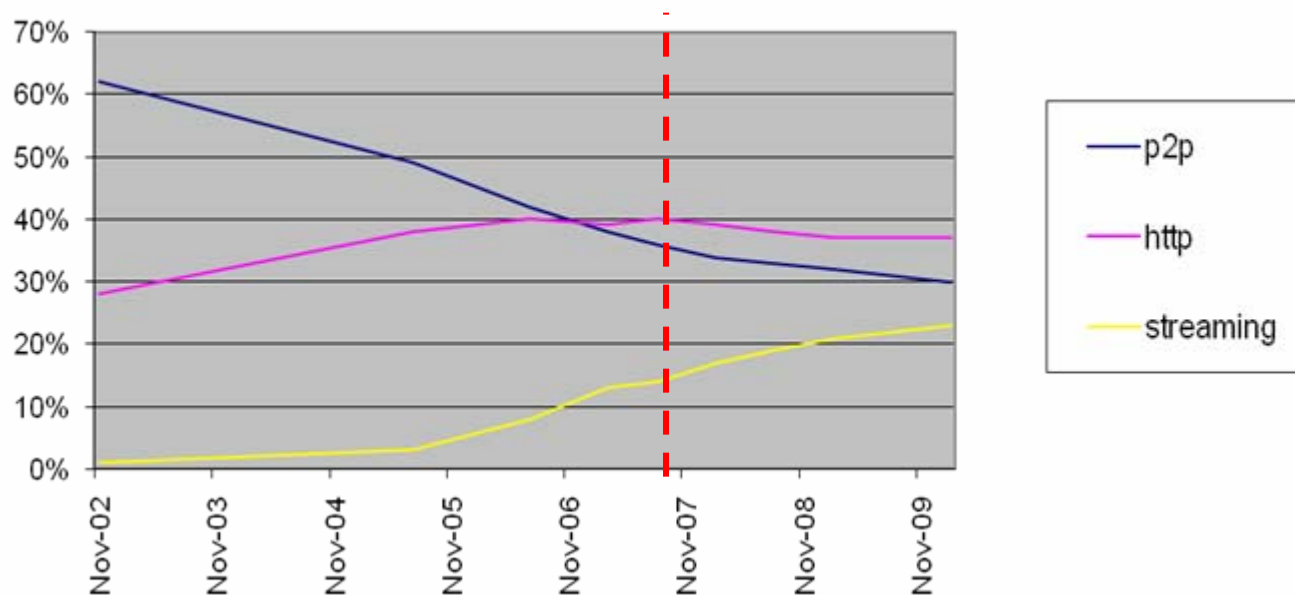


Deep Packet Inspection (DPI):

Unique Visibility into Internet Traffic Trends

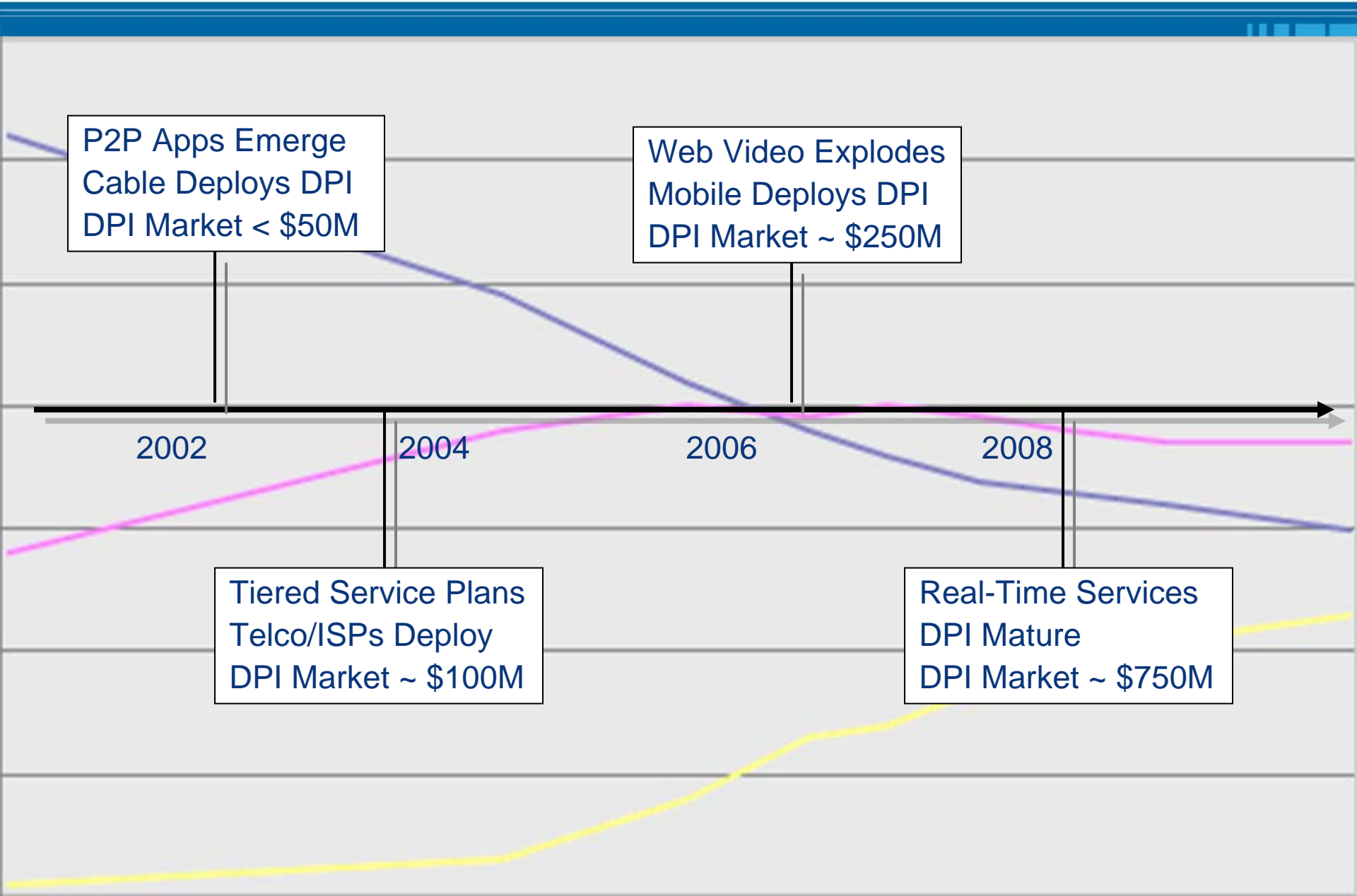
- ❑ Today – YouTube generation:
 - ❑ 100Kbps, low quality, ~2Mbyte per clip
- ❑ Tomorrow – Joost, CBS on Demand, BBC on demand...
 - ❑ 1Mbps, full screen, ~200Mbyte per clip
- ❑ 2010 – HD on Demand
 - ❑ 10Mbps, HD quality, ~1Gbyte per clip

*Data type
as a % of
all traffic*



- ❑ Video is growing twice as fast as all other data types
- ❑ Streaming media will be about $\frac{1}{4}$ of all traffic by end of decade

Smarter Networks: DPI and the Internet's Evolution



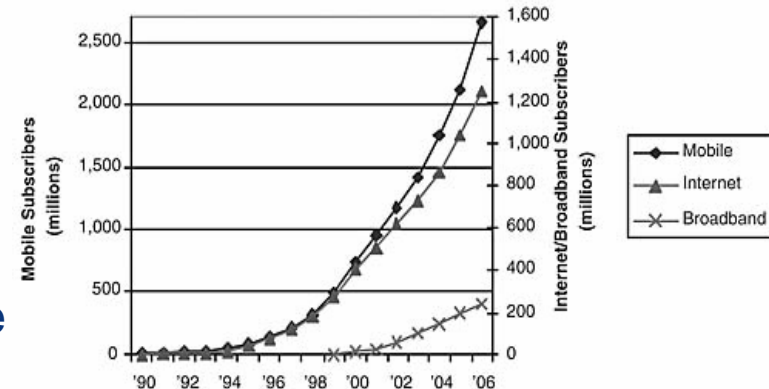
Mobile Video Trends

Video Trends:

- Over 1 billion video streams will be served every month by end of decade

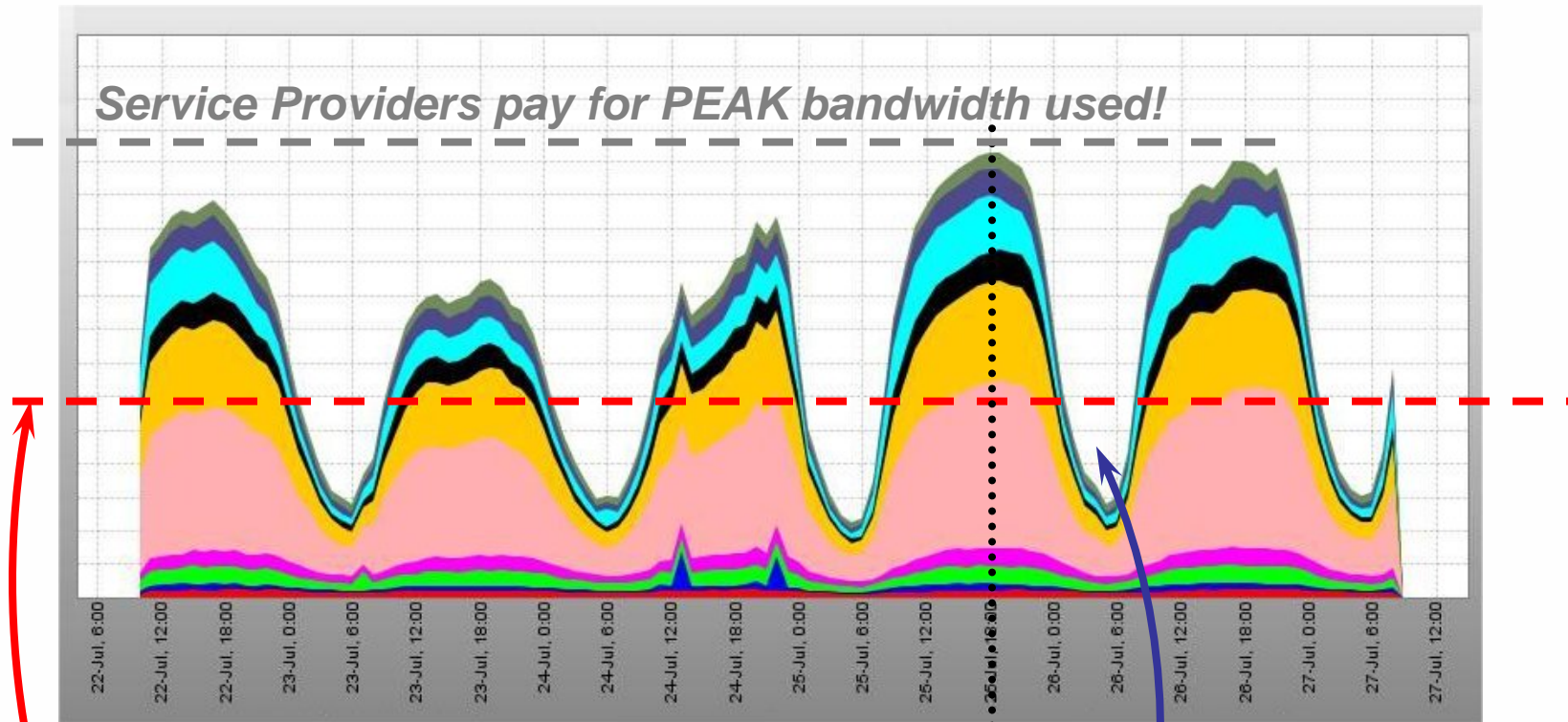
Top U.S. Online Streaming Video Properties March 2007 Source: comScore Video Metrix		
Property	Unique Video Streamers (000)	Reach (%) Among Total U.S. Internet Users
Total Internet	126,635	71.4%
Google Sites	57,376	32.3%
Fox Interactive Media	47,446	26.7%
Yahoo! Sites	34,532	19.5%
Time Warner Network	28,945	16.3%
Viacom Digital	20,245	11.4%
Microsoft Sites	17,933	10.1%
Sony Online	11,956	6.7%
Disney Online	9,801	5.5%
ESPN	8,603	4.9%
ABC.com	7,033	4.0%

- Mobile video uptake rates will exceed wireline with faster growth of mobile broadband users
 - Opportunity for Mobile operators to package and deliver streaming services
 - Mobile broadband application types will need to be detected and properly rate controlled on a per-subscriber basis to prevent network congestion



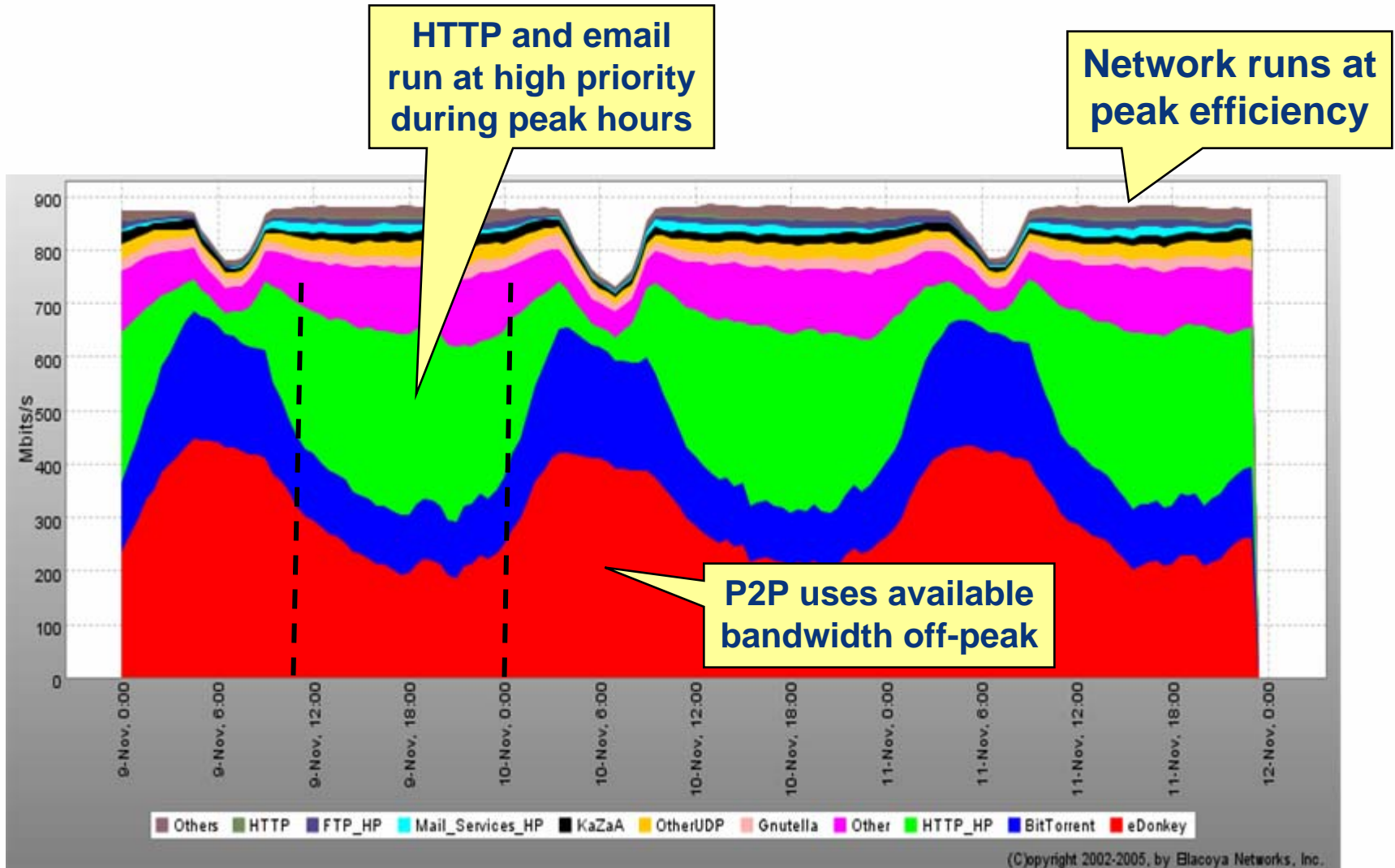
Typical Network Today

Bandwidth by application over a 5 day period



- **Low average utilization**
- **Humans contend with "IP Robots" during peak times**
- **Under-used during off-peak times**

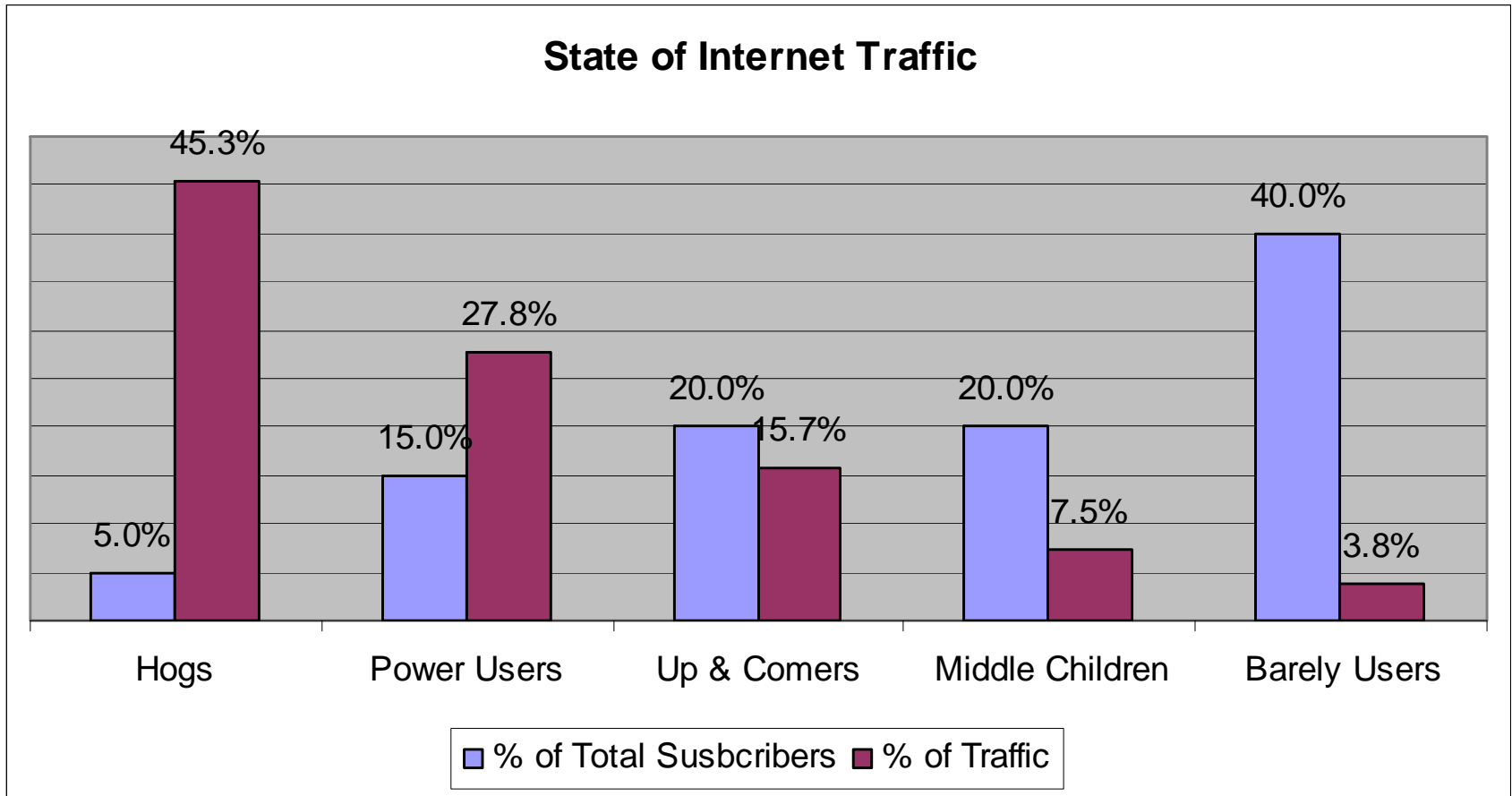
Future Networks will be More Efficient and Adaptive



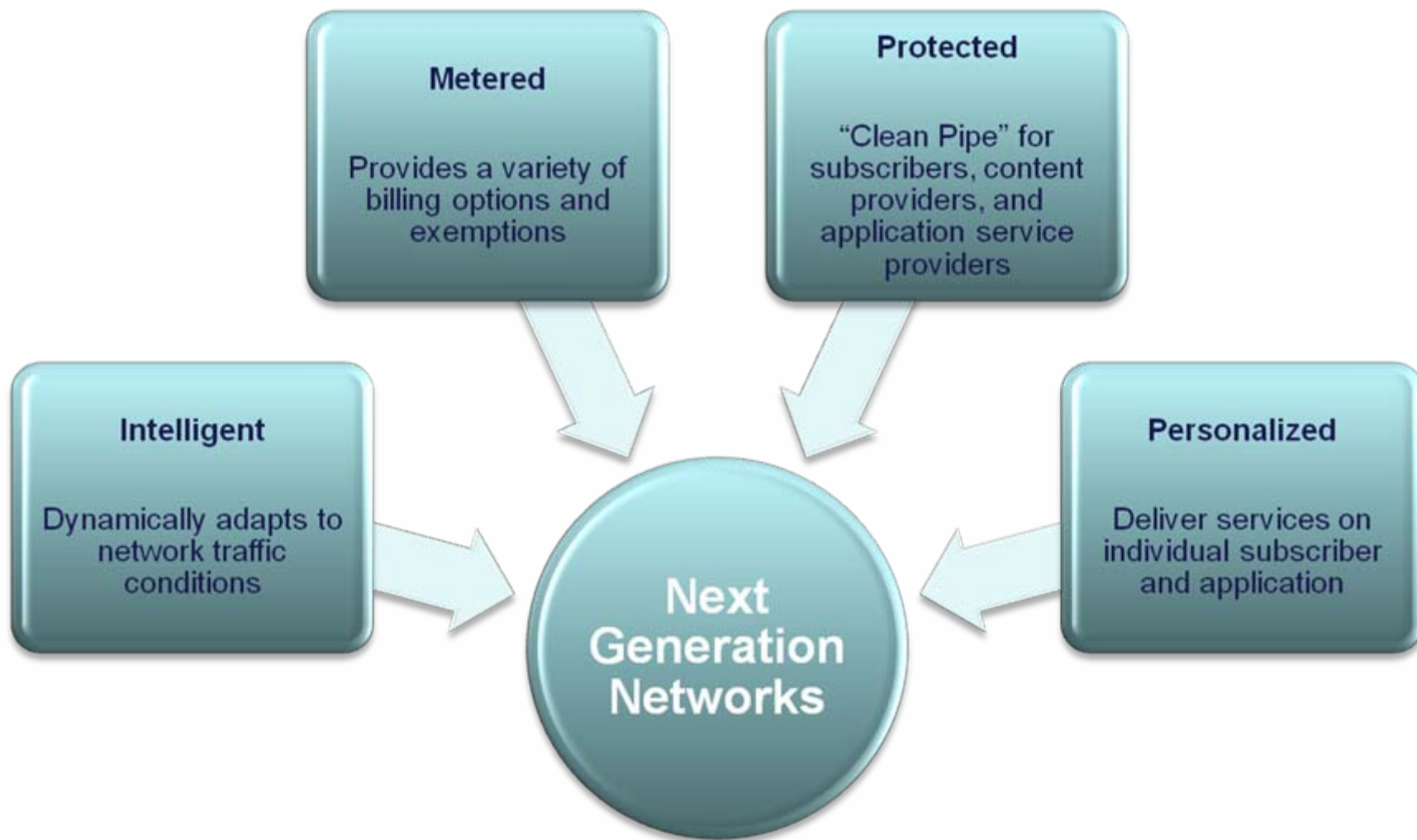
(Copyright 2002-2005, by Ellacoya Networks, Inc.)

State of the Internet Today

(Source: Ellacoya worldwide customers)

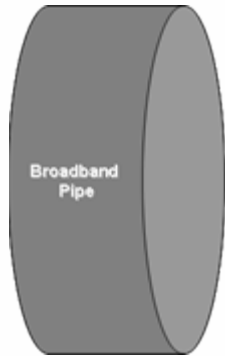


Characteristics of Next-Generation Networks

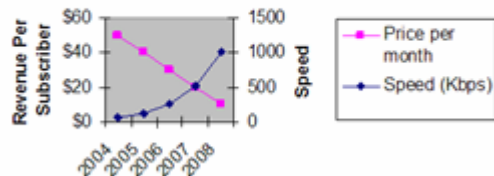


Service Providers become "Services" Provider

Services Migrate from Mass Market to Individual Subscriber



The Race to Infinity on Speed; and Race to Zero on Price

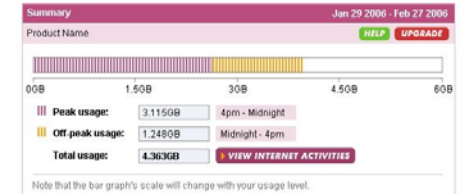


DPI-Enabled Service Plans

- Pay As You Go**
 - Broadband Pay As You Go (formerly 'Lib'), £14.99 per month
 - Maximum speed available
 - Pay As You Go for data transfer
 - AGD download included
 - £7.50 per additional GB (Friday, or £5.75 to Pay As You Go)
 - Ideal for infrequent or light users who want the fastest speeds available.
- P2P Restricted**
 - "New" Broadband Plus, from £14.99 per month
 - Fixed monthly cost
 - No fair usage limits
 - High bandwidth activities, such as p2p, speed restricted during peak times
 - Ideal for those customers who want to upgrade forward and fast internet
 - Pay for speed, not usage
 - Speed Price
 - 5,200 (£14.99 (inc VAT))
 - 18M (£18.99 (inc VAT))
 - 20M (£24.99 (inc VAT))
 - Up to 88M TBC
- Premium Unrestricted**
 - Broadband Premier, Priced From £21.99
 - Maximum speed (Max 88M, up to 88M later in 2008)
 - Fixed cost
 - No traffic shaping or speed restrictions applied
 - Highest performance delivery
 - Guaranteed fair usage policy
 - Ideal for bandwidth hungry customers on one connection, and for downloading and streaming media and running high bandwidth applications
 - Price Fair usage thresholds
 - £18.99 200M per month peak time, potential inc. off peak usage of 220GB*
 - £21.99 300M per month peak time, potential inc. off peak usage of 230GB*
 - £26.99 500M per month peak time, potential inc. off peak usage of 270GB*
 - £36.99 750M per month peak time, potential inc. off peak usage of 270GB*

View my broadband usage

Keep track of how you're using your broadband connection using the View my broadband usage tool.



This week's usage in detail

	Mon 13	Tue 14	Wed 15	Thu 16	Fri 17	Sat 18	Sun 19
Peak	3.5MB	0.0MB	0.0MB	0.0MB	0.0MB	0.0MB	0.0MB
Off-peak	1.5MB	0.5MB	0.0MB	0.0MB	0.0MB	0.0MB	0.0MB
Total	5MB	0.5MB	0.0MB	0.0MB	0.0MB	0.0MB	0.0MB

Peak usage: 3.5MB Off peak usage: 2MB Total usage: 5.5MB

[View this month's usage](#) [View your usage history](#)

Welcome to the *Personal Internet*

Providing every single subscriber with his/her own set of customized services

- ❑ **Tailored Service Plans for individual customers**
- ❑ **Personalized service plans by application, quality, speed, usage quotas, price, content, etc**
- ❑ **Offer customers more of what they want**
- ❑ **Maximize profitability**

Subscriber Self-Service Portal

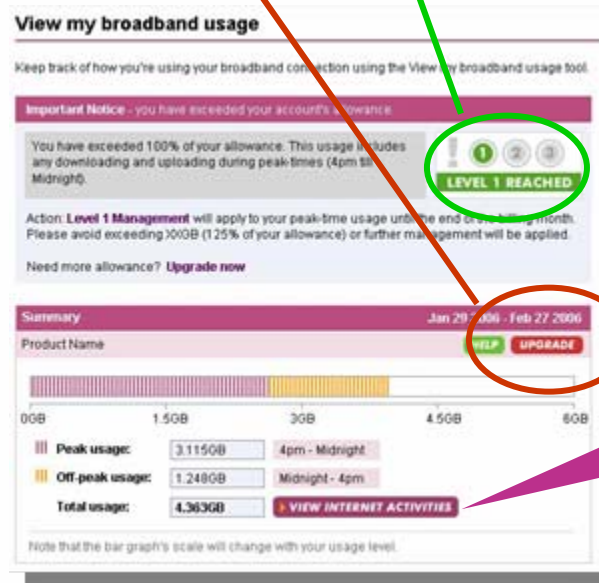


Self-Service Upgrade

Quota Breech



View Daily Usage



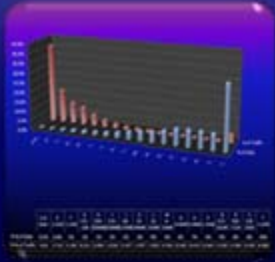
Up-Sell on Quota Breech

	Peak usage	Off peak usage	Total usage
Web:	25MB	25MB	50MB
Email:	70MB	50MB	120MB
VOIP:	00MB	00MB	00MB
Gaming:	30B	10B	40B
Streaming:	10MB	3MB	13MB
PlusNet FTP:	00MB	20MB	20MB
P2P:	0.5MB	100MB	100.5MB
Usenet:	10MB	30MB	40MB
FTP:	00MB	20MB	20MB
Other:	00MB	00MB	00MB
Total usage so far	3.115GB	1.248GB	4.363GB

The data on this page is from 2 hours ago, your current usage may be higher. Please bear this in mind if you are close to exceeding your account's included usage.

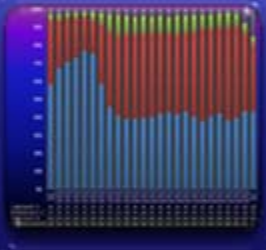
View Usage by Applications

Wireless Trends: Key Findings



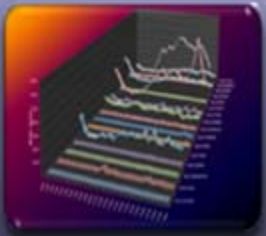
Subscriber Classes

- Top 5% of Subscribers generate 90% of traffic
- 95% of all subscribers use under 125 MB per month, generating only 10% of total traffic
- 0.2%, use over 5 GB per month, generating 40% of total traffic



Analysis of Heavy Users

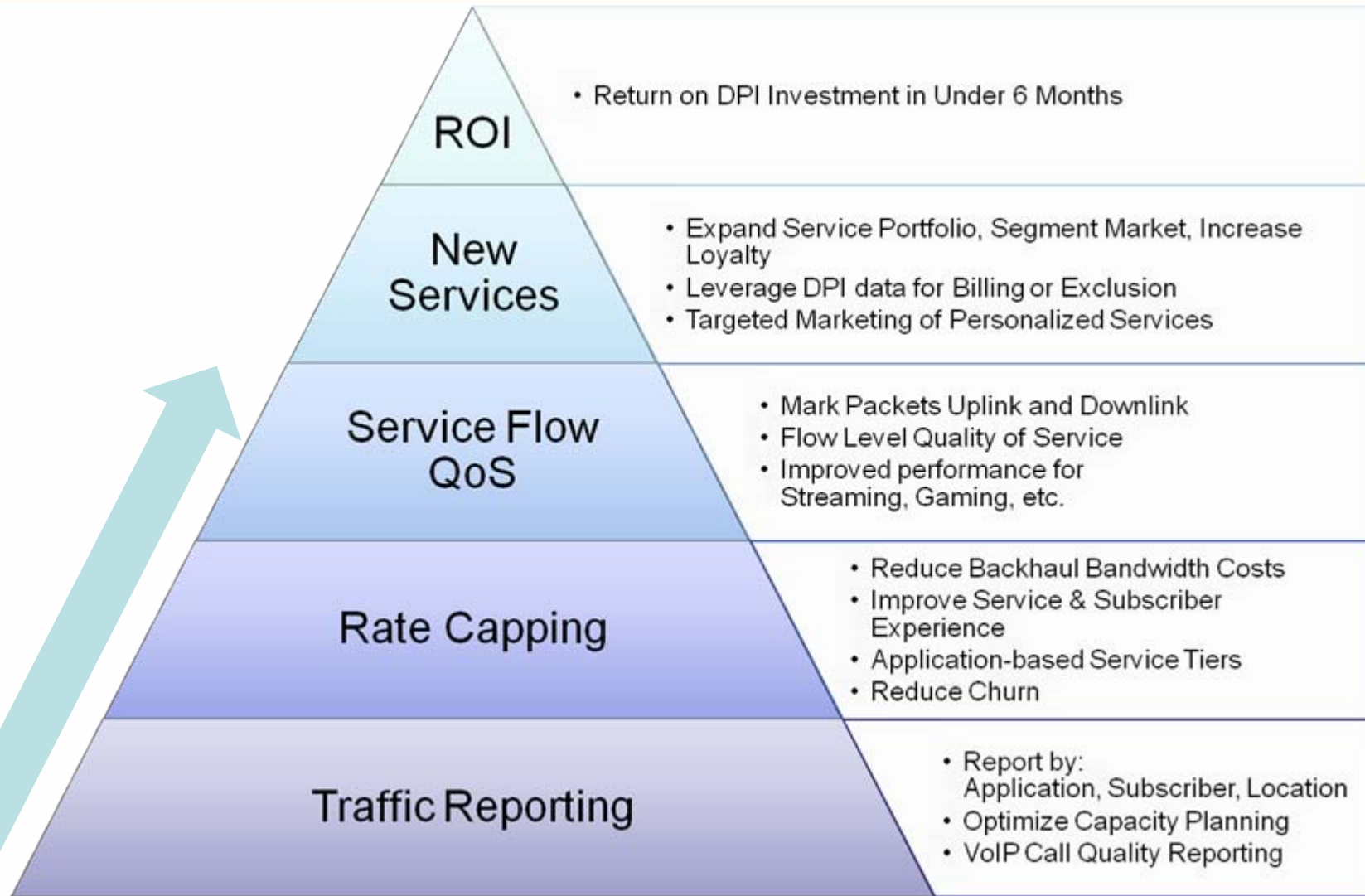
- Top users generate over 5 Gbytes per day; 100 Gbytes per month
- P2P file sharing is used mostly by very heavy users, and consumes 25% of all capacity at peak hour
- Other top Applications: HTTP, VPN, Streaming, Gaming, Sling



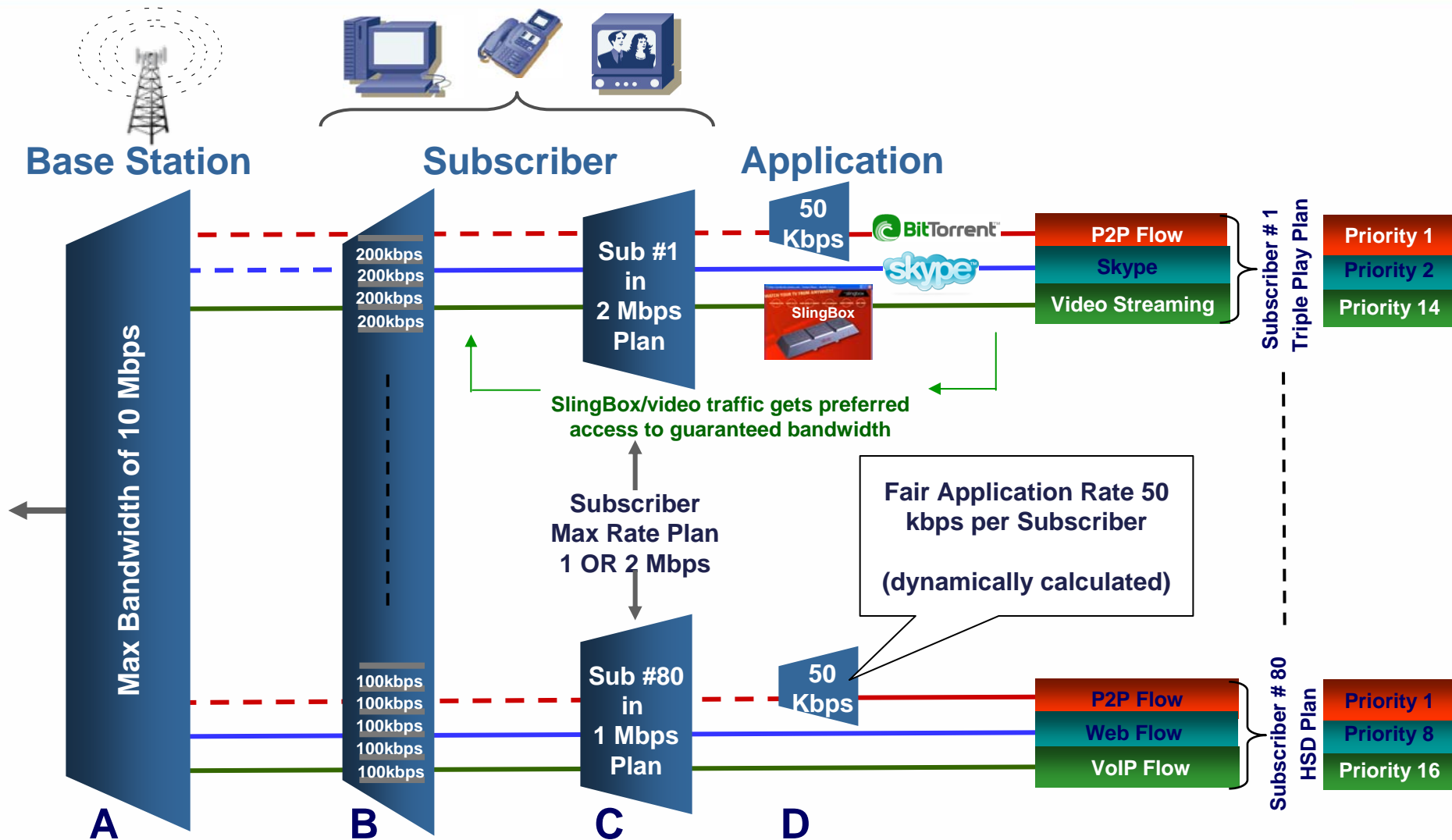
Typical User Usage Patterns

- Top Applications:
WAP, Streaming, Music Store, Picture Mail, email
- Top Web Sites:
Google, MySpace, Yahoo, FaceBook, YouTube, MSN, eBay, weather

The Role of DPI 3G and 4G Networks

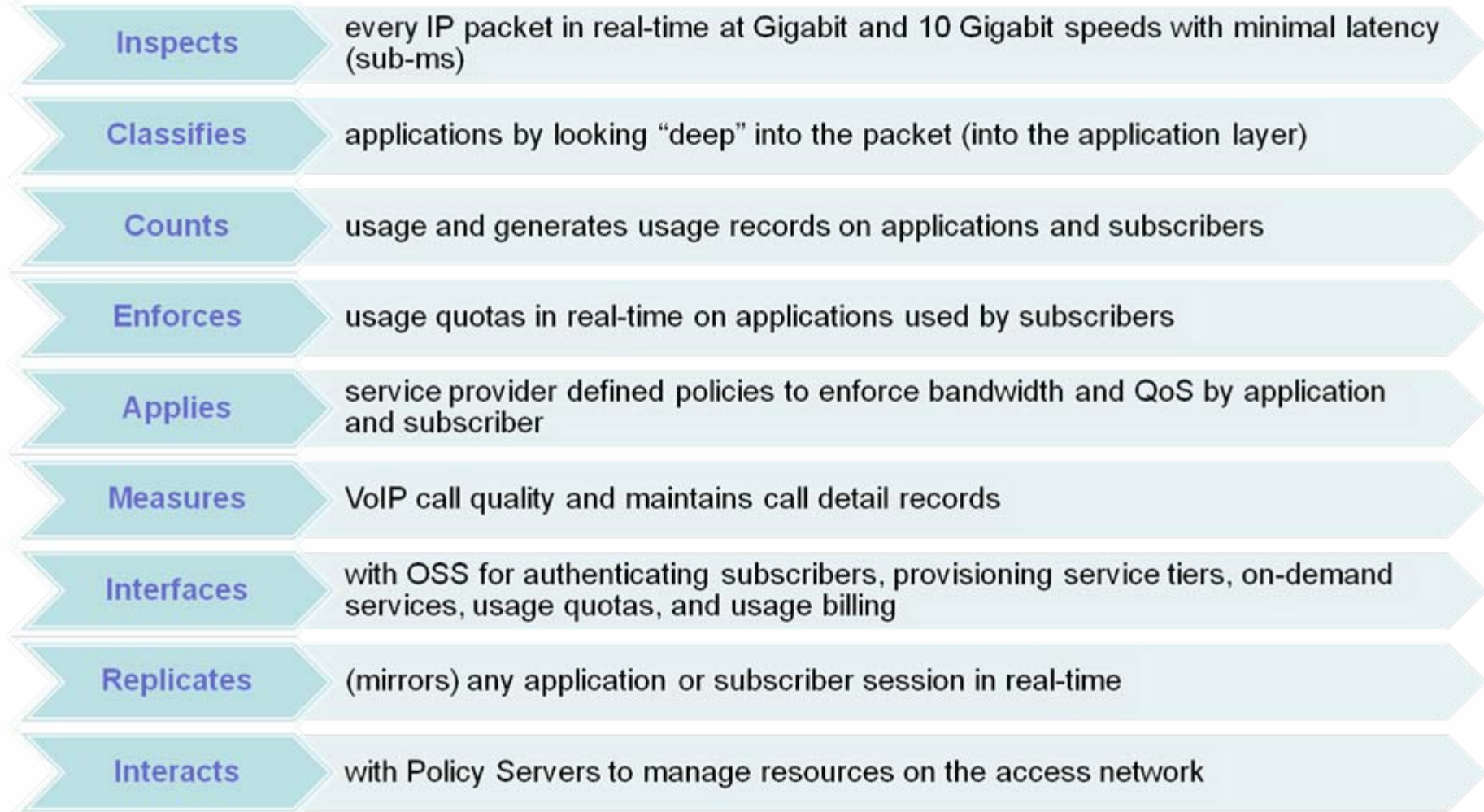


Multiple Control Decisions for Every Packet



Service Fairness with Dynamic Policy Enforcement

Introducing Ellacoya's Deep Packet Inspection



Ellacoya e100 – the next evolution of DPI



Rich suite of applications (Service Logic Software)

ROI Ranges from days to months

Simple Programming interface for easy integration:
3rd Party Applications
OSS/BSS/Provisioning

4th Generation custom FPGAs

Industry Leading e100

Performance – Wirespeed 10G DPI

Scalability – up to 500,000 subscribers per platform

Carrier-class - highest availability/levels of redundancy

Unique Features of the e100:

- ❑ 3-tier architecture for scaling and distributed management
- ❑ Soft signatures
- ❑ Asymmetric flows
- ❑ Aux port for policy-based mirroring
- ❑ Point-and-click service creation and provisioning
- ❑ Intuitive subscriber management configuration

Full Speed, 10G and Beyond



4th Generation Ellacoya ASICs for Flow Management & Content Inspection

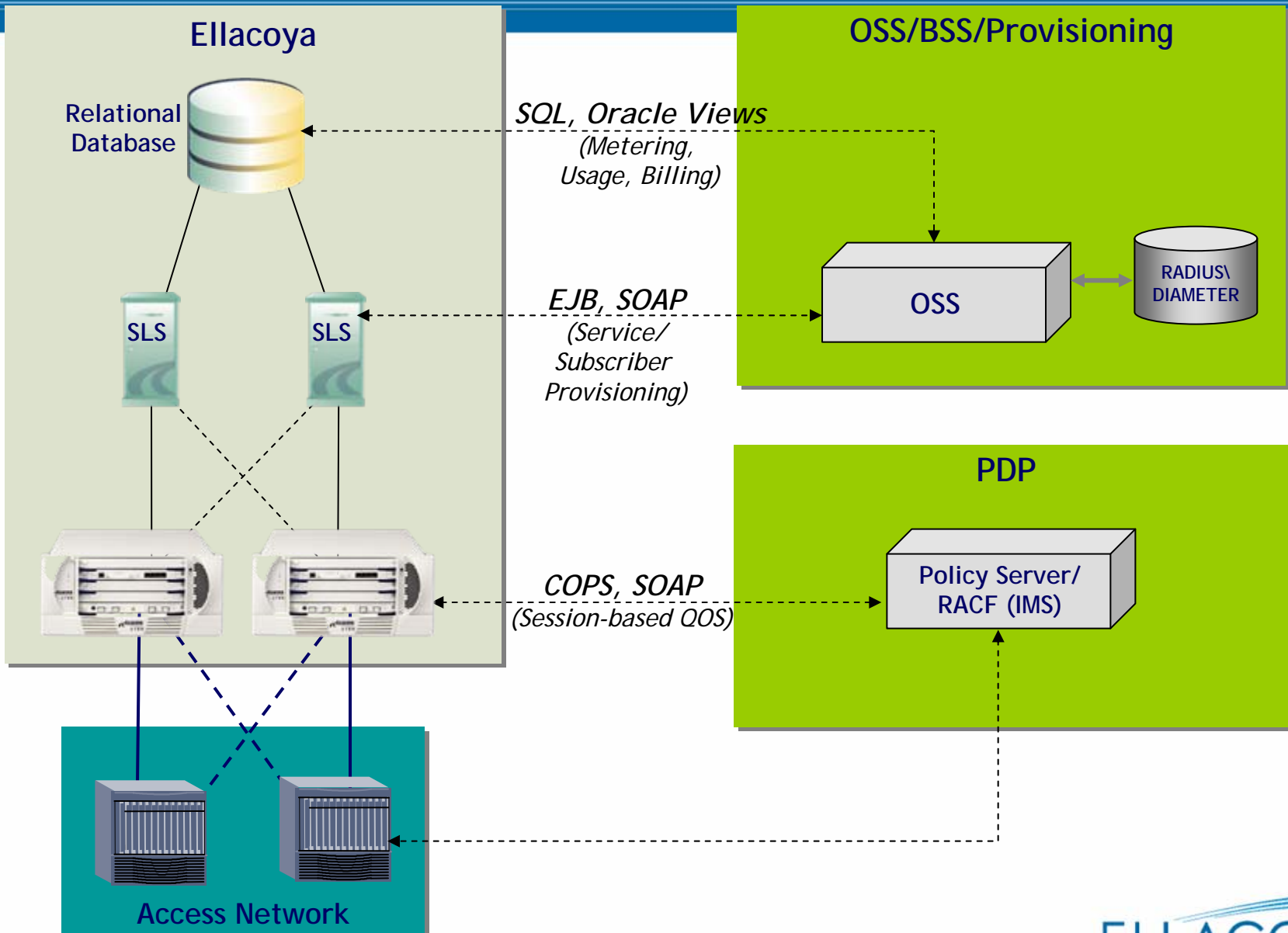
Flow Management FPGA

- Session establishment and policy resolution with no CPU intervention
- Flow management (aging, re-classification, etc.) in hardware
- 1 million flows per second setup
- Hierarchical rates and prioritization
- Usage counters and quotas

Content Inspection FPGA

- Detects applications by inspecting upstream and downstream traffic independently
- Sophisticated multi-component signature detection
- Multiple signatures within a packet and/or across multiple packets
- Sub-classifies applications like YouTube with HTTP application
- Sub-classifies video and audio and other MIME types

Flexible OSS Integration is Key



Conclusions

- ❑ True convergence is finally coming
 - ❑ Real-time video streaming is the fastest growth application type
 - ❑ Within 5 years the internet will have roughly equal amounts of low priority background traffic, medium priority browsing and high priority video and voice
- ❑ Broadband wireless will just accelerate these trends
- ❑ Intelligence trumps Bandwidth
 - ❑ We can no longer survive by “throwing bandwidth at the problem”
 - ❑ Future networks must be intelligent on a per-packet, per-subscriber and per-application basis

Thank You!

