Alcatel IPv6 Vision
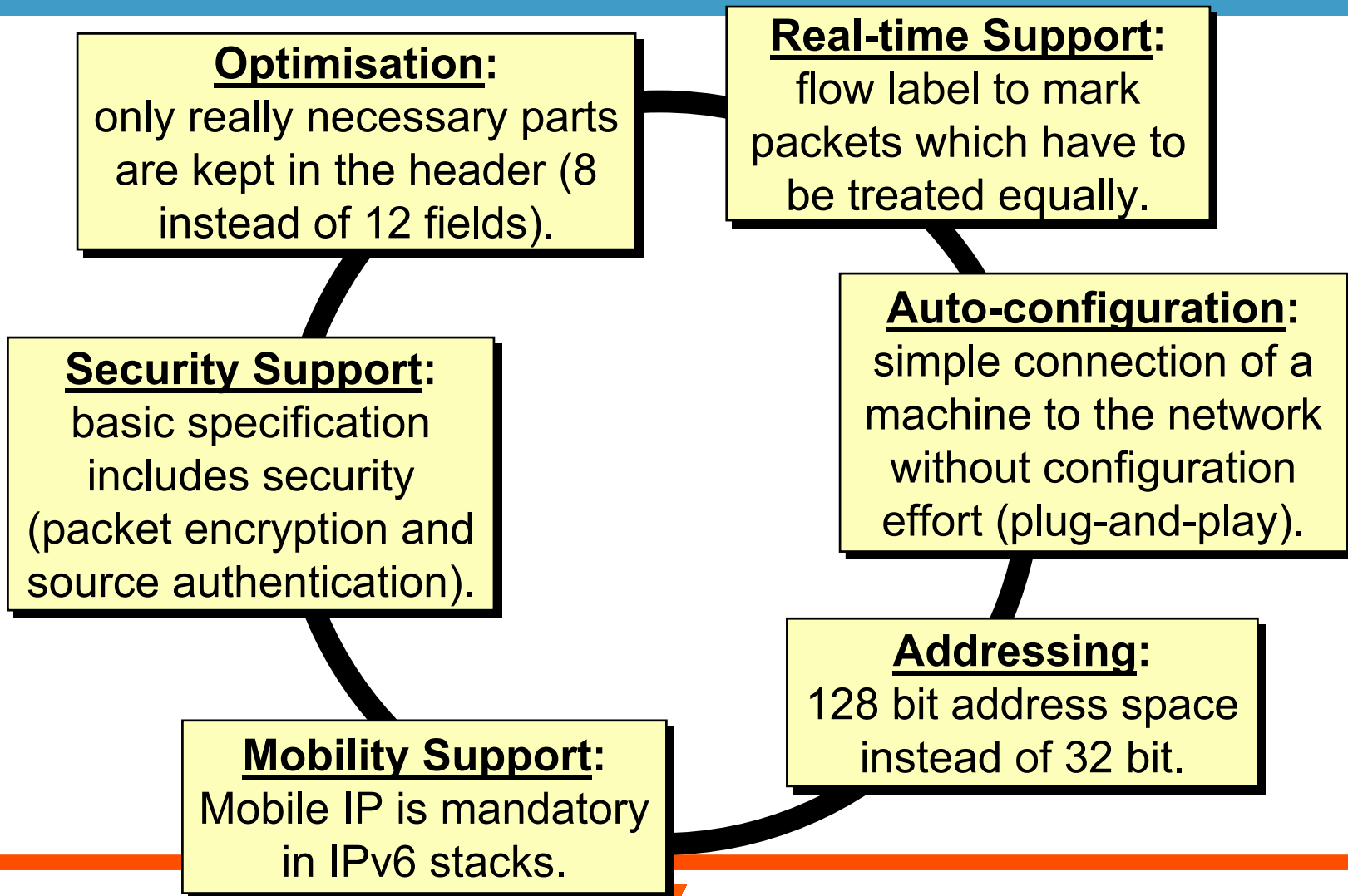
Matteo Gumier
Marketing, Strategy and Technology group

IPv6 Italian Task Force
Torino – July 05

Agenda

■ IPv6: which kind of urgency

■ The "Always On" paradigm as a possible IPv6 enabler

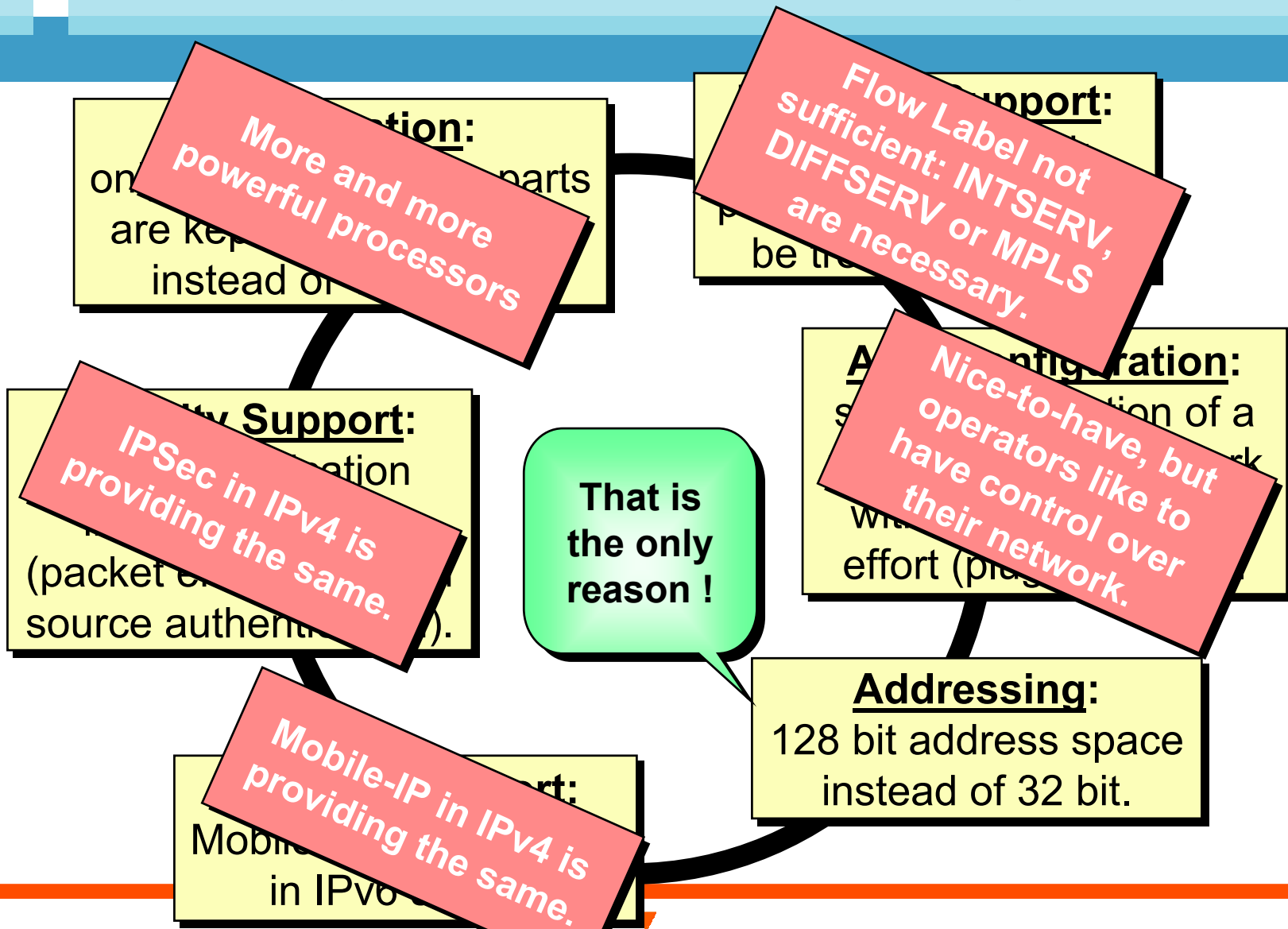■ IPv6 and the 3-Play service

■ The Alcatel approach to IPv6

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Why IPV6?
Tecnical Arguments Pro IPv6

Optimisation:
only really necessary parts are kept in the header (8 instead of 12 fields).

Real-time Support:
flow label to mark packets which have to be treated equally.

Auto-configuration:
simple connection of a machine to the network without configuration effort (plug-and-play).

Security Support:
basic specification includes security (packet encryption and source authentication).

Addressing:
128 bit address space instead of 32 bit.

Mobility Support:
Mobile IP is mandatory in IPv6 stacks.

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Header Compression:
on... parts are kept... instead of...

More and more powerful processors

Flow Label not sufficient: INTSERV, DIFFSERV or MPLS are necessary.

Support:
...p... be tr...

Security Support:
...cation... (packet e...) source authenti...).

IPSec in IPv4 is providing the same.

That is the only reason !

Auto-Configuration:
s... tion of a ...rk with... effort (plu...

Nice-to-have, but operators like to have control over their network.

Addressing:
128 bit address space instead of 32 bit.

...rt:
Mobile... in IPv6 ...

Mobile-IP in IPv4 is providing the same.

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IPv6 for Mobile

Adoption of IPv6 in mobile infrastructure will be one of the biggest driver in the migration to IPv6

- Gartner Dataquest, sept 2004

Some numbers:

➢ over 1.8 billions of cellular subscribers *

➢ 22 million 3G users *

From www.3gamericas.org, march 05

3GPP mandates IPv6 support in the Internet Multimedia System (IMS) and the UMTS Terrestial Remote Access Network

IPv6 for Mobile
The Always on paradigm – Mobile users

➢ IMS requires each terminal to have an open signalling context towards a proxy CSCF to be ready to receive incoming multimedia calls.

➢ So far, each IMS terminal holds one IP address as long as it is switched on (always on).

➢ There are less than 128 class A networks which can provide at most 16 million IPv4 addresses, and some mobile network operators already have more than 20 million customers.

The compelling reason to switch to IPv6 is IPv4 address space exhaustion due to "always on" services like IMS.

IPv6 for Fixed
The Always on paradigm – Fixed users

➢ **Business**
- Enterprise Voice over x,
- Enhanced and flexible VPNs,
- RFID tags, control systems
- etc

➢ **Residential Broadband Entertainment**
- Multi-Media (VoIP, IPTV, Music etc),
- Gaming,
- Peer-to-peer network users

➢ **Automotive**
- Multi-Media (music, news etc),
- tied to service provides (emergency, garage, manufacturer),
- positioning and directions.

Some numbers:

➢VoIP: > 5 million subscriber worldwide

➢IPTV: 72M IPTV subscribers* by 2010

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The compelling reason to switch to IPv6 is IPv4 address space exhaustion due to "always on" services like 3Play

IPv6 for FMC
The Always on paradigm

The Heavy Reading inquire (December 2004), revels that:

➢ The 2006-2007 Time Frame will be critical to FMC technology and Services development.

➢ In the core network, the boundaries between fixed and mobile technologies will be largely dissolved by 2010-2012.

➢ Access networks are likely to continue to include a wide range of technologies even after the FMC is established in the network core.

➢ Service providers are taking a fairly optimistic view of FMC, and by and large they believe it is going to bring fundamental changes to the structure of telecom market.

There is a huge need of IP addresses !

"Omnes viae IPv6 ducunt"

Like the Y2K, IPv6 is inevitable

➤ Critical difference is that the transition to IPv6 will not happen at a stroke of midnight

➤ IPv6 is designed to co-exist with IPv4

No "one-size-fits-all" answer to the "transition" question

Some possible transition scenarios

➤ IPv6 transport at Layer 2

➤ IPv6 at the edge and tunnels over IPv4 backbone

  • IPv6 over IPv4 tunnels

  • IPv6 over MPLS infrastructure

➤ Dual stack IPv4-IPv6 network

➤ Parallel IPv6 only network

(*) All roads go to IPv

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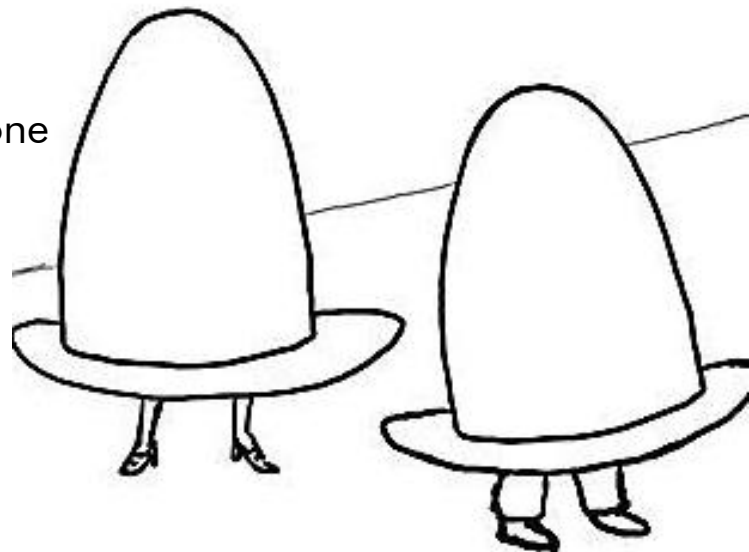
When ?
IPv4 Address Space Exhaustion Predictors

Department of Defense moving to IPv6 (2003)

The Department of Defense has established the goal of transitioning all DoD networking to the next generation of the Internet Protocol (IP), IP version 6, by FY 2008. (latest status at http://ipv6.disa.mil/)

Interest In IPv6 Found To Be Lagging (May 2005)

Although it has been in the work for a decade, the next-generation Internet protocol IPv6 has failed to excite the interest of key decision makers in the federal government and private sector, according to a survey by equipment vendor Juniper Networks.

Juniper's Federal IPv6 IQ Study found that less than 7% of respondents consider IPv6 "very important to achieving their IT goals," despite the fact that the protocol is designed to address, among other things, many of the quality of service, security, and network management issues that concern them.

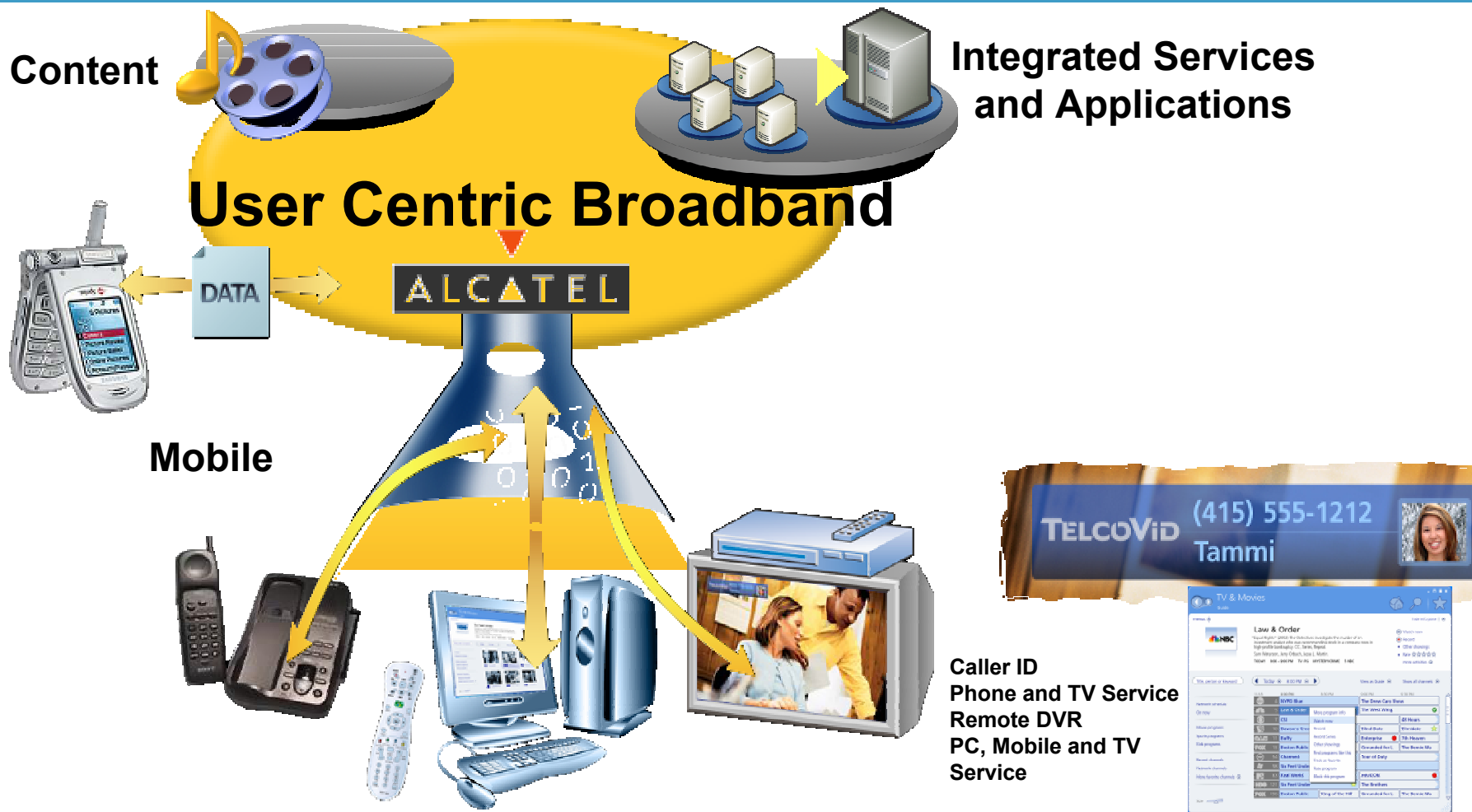## Exhaustion of the IPv4 unallocated Address Pool
  ➢February 2014

Complete Exhaustion of all available IPv4 Address Space
  ➢September 2021

Source: http://bgp.potaroo.net/ipv4/ - dated 06:01 7 June 2005 (UTC+1000)

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IPv6 for 3Play
A Multimedia Connected Home

Content

Integrated Services and Applications

User Centric Broadband

DATA

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Mobile

(415) 555-1212
TammI

TELCOViD

Caller ID
Phone and TV Service
Remote DVR
PC, Mobile and TV
Service

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IPv6 for 3Play
Today's Business and Consumer Service Drivers

Business

- **Improve performance**
- **Reduce complexity, costs**
- **Ensure business continuity**
- **Ensure Security**

Consumer

Triple Play

- **User Centric**
- **Always On (VoD, IP-TV, VoIP)**
- **Interactive multimedia**
- **e-communication**

New Markets

- **Verticals**
- **Wholesale**
- **Customization, bundling & choice**

IPv6 Triple Play / July 05

IPv6 for 3Play
Business and Consumers Expectations

Alcatel 7450 ESS and 7750 SR

Enterprise Communication Needs

Other
Destinations

With
Partners Sites

Between
Corporate Sites

INTERNET

EXTRANET

INTRANET

London
June17th 2003   7

Enables "ALWAYS ON" Services for

BUSINESS COMMUNICATIONS

CONSUMER ENTERTAINMENT

IPv6 for 3Play
The Alcatel's advanced approach for reliability

Business Services & Triple Play

Reliability for Non-stop Services (NSS), with zero service downtime with NSS (VPLS, VLL)

Alcatel's HA Solution Includes

- ➢ Nonstop Routing
- ➢ Graceful Restart
- ➢ Nonstop Service
- ➢ Configuration Redundancy

What about a failure during a football match ?

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IPv6 for 3Play
The Alcatel's advanced approach for reliability

Combination of hardware and software technology that delivers

> ➤ True carrier grade IP and MPLS

> ➤ A non-stop control plane

> ➤ Reliability, availability and security

Software

➤Truly modular IP and MPLS software stack

➤Non-stop routing software for BGP4, OSPF and IS-IS

➤On-line software upgrades

Hardware

➤Industry standard hardware redundancy (fans, power, fabric, etc.)

➤Additional proprietary control plane redundancy support

From the gound Alcatel's IPv6 products are carrier grade.

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IPv6 for 3Play
The Alcatel's advanced approach for reliability

IPv6 is designed according the same architectural and design philosophy

- ➢ separate processing block for each protocol

- ➢ memory protection between blocks

- ➢ overload protection….

Migration scenarios

- ➢ going dual stack all the way

- ➢ 6PE, MPLS through the core

- ➢ tunnel brokers

IPv4/IPv6 coexistence, interworking and transition are non trivial issue:

- ➢ *Speed of transition is unknown*

- ➢ *Typical approach minimizing investment and operational risk*

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Video: Transforming the Network Requirements

CONSUMER ENTERTAINMENT

Massive Bandwidth Scaling
- 20Mb/s to 100Mb/s per subscriber

QoS for Multiple Services
- Scale QoS mechanisms, enforce service interaction per-sub., per-service

Policy scaling
- Scale security, anti-spoofing, accounting, filtering, policing etc.

Multicast & Unicast
- Any mode of operation & optimize architecture for BTV as well as 100% VoD

High-availability
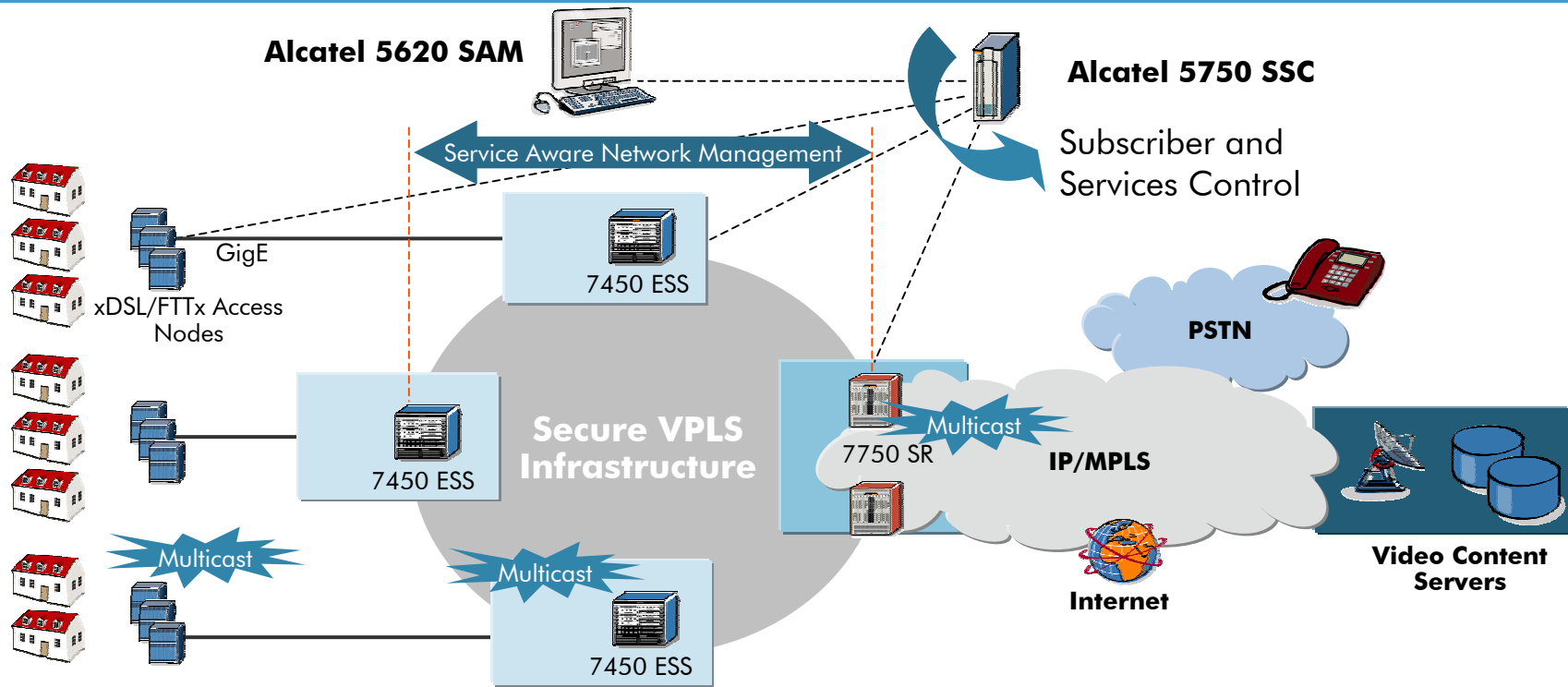- Per-path, per-link, per-node HA, across the network

Flexibility
- Support for any mode of operation – minimized risk

Optimized Cost Structure
- Linear, predictable (non-exponential)
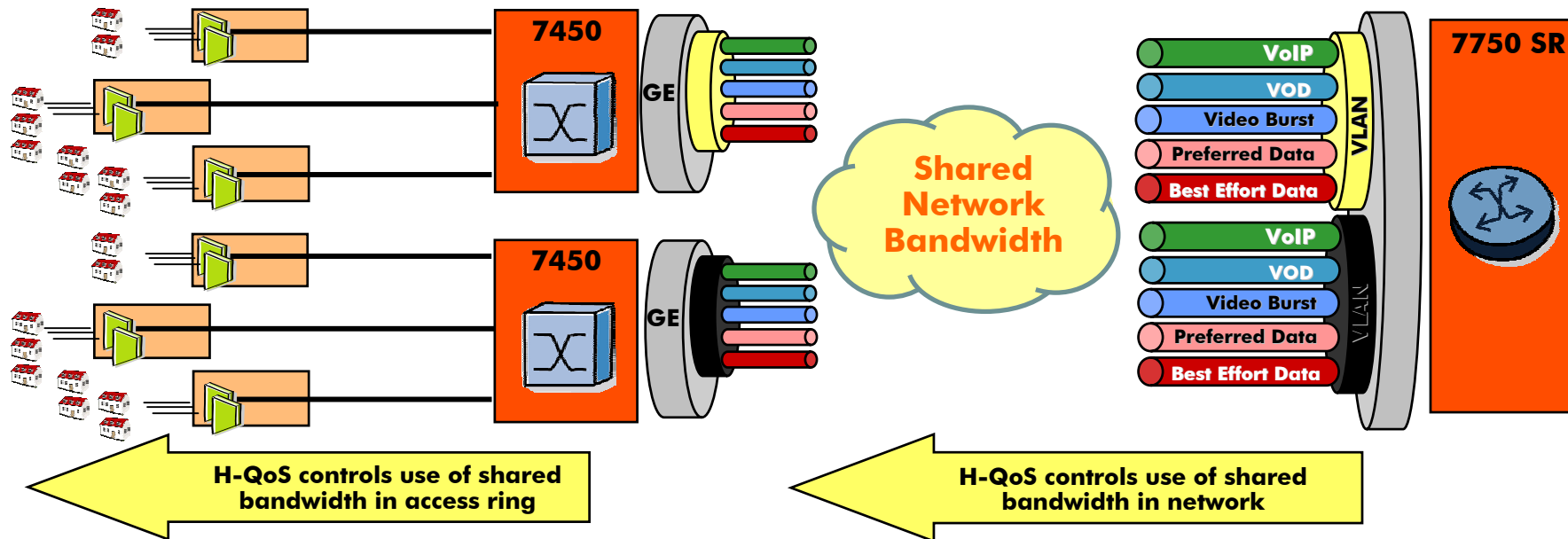- Streamlined network & service operations

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Alcatel's Triple Play Service Delivery Architecture

Alcatel 5620 SAM

Alcatel 5750 SSC

Service Aware Network Management

Subscriber and Services Control

GigE

xDSL/FTTx Access Nodes

7450 ESS

Secure VPLS Infrastructure

7450 ESS

Multicast

Multicast

7450 ESS

PSTN

Multicast

7750 SR

IP/MPLS

Internet

Video Content Servers

- 7450 performs per-sub queuing, accounting and policy enforcement – allows QoS to scale
- Secure Layer 2 forwarding model to 7750
- Multicast enabled (IGMP proxy, ev. to MLDv1/v2).

- 7750 is the IP service edge
  - Layer 2 termination and IP unicast/multicast routing
  - Reduced queue and interface scale
- QoS per-service and per-content

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H-QoS for Managing Shared Network Bandwidth

H-QoS controls use of shared bandwidth in access ring

H-QoS controls use of shared bandwidth in network

7750 Queuing provide application prioritization and shaping

- Application flows can be defined per any L2-L4 classification
- Individual applications can be rate limited if desired

7750 H-QoS manages capacity in shared-bandwidth network

- Bandwidth shaping per access ring
- Individual access rings can have independent committed and peak rates

Service Empowerment and Policy Enforcement

Personalized & Interactive User Experience

Self-service Portals

Service driven QoS

Try-and-buy weekend specials

Network Admission Control

Distributed Policy Enforcement

SUBSCRIBER and USAGE CONTROL

REVENUE CONTROL

Flexibility and Cost Savings

NETWORK INFRASTRUCTURE CONTROL

7450 ESS
7750 SR

Competitive and Profitable Services

Account usage

Prevent abuse

Control usage (peer-to-peer)

On-demand Services

Flow-through OSS integration

Centralized Policy Management

Effective and scaleable control

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BROADEN YOUR LIFE

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