

Everything you wanted to know about IP-TV but were afraid to ask...

- Operators worldwide are betting on the prospect of an all-IP future for television. But what's IP-TV really about?
- IP-TV brings broadcast quality video to broadband networks, giving operators the chance to make the 'triple play' of voice, data and broadcast entertainment a reality for their customers.



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Triple Play Vision

- **Media-Telecom convergence** is a multi-faceted movement
- •Service and network convergence: a wide range of applications over a single network
- •Device convergence: PC's, STB's, mobile phones support communication and media consumption
- •Industry convergence: hitherto unrelated industry players enter a new arena of competition
- >**User-Centric View**
- •Observing the emerging examples of, and the opportunities for richer user experiences of networked electronic media
- •Convergence phenomena reflect societal shifts
- - The empowered user seeks control, self-realisation and participation

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Why is Triple Play so important?

- Operators are keen to exploit their investments in broadband by delivering new data services that are valued by their customers and will help them compete against new entrants* offering everything from basic Internet access to Voice over IP (VoIP), content and peer to peer services.
- Integrated IP services that combine communications and content in a user-configurable environment provide the differentiator telecom operators need, and IP-TV forms a key element of this strategic response.

*Cable network providers



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Motivation

The Triple Play laboratory is ready•

Equipment, broadband infrastructure and multimedia devices are in place•

Components are available: voice, data, video

User-Centric Experimentation•

Don't make the alchemist's mistake of looking for the essence: the killer application•

Create and discover new user experiences that combine the basic components in innovative ways

The first intriguing phenomena in the converged world can now be observed



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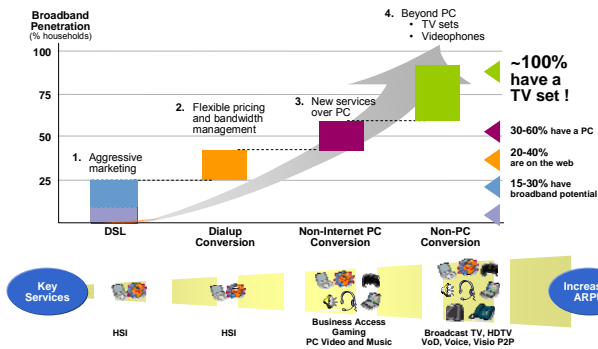
Motivation cont.

- Why do Triple Play????
 - One method of extracting more revenue from a DSL line
 - Trying to improve a marginal business case for Internet Access
 - A significant defensive move against the cable threat
- Triple play is a big step
 - Content acquisition is an important issue
 - Own or share a head end?
 - Buildout of access network can be costly
- Impact of HDTV must be considered
 - Bandwidth requirements / channel capacity
 - MPEG-4 equipment
- Video on Demand is a significant revenue opportunity

The demand for more advanced video-related capabilities will continue to rise.

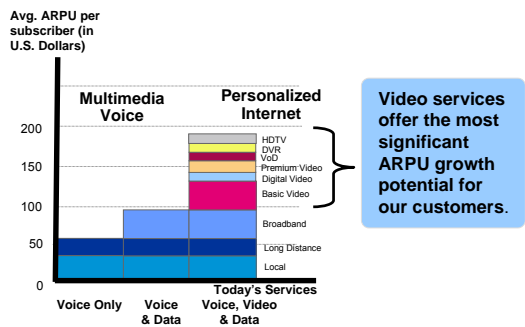
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Multi-service Requirements Drive Broadband Adoption



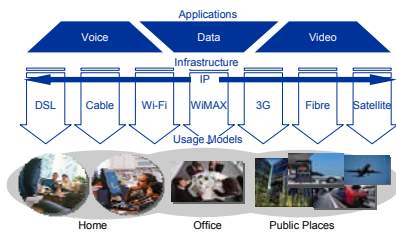
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Triple Play = Triple Pay?



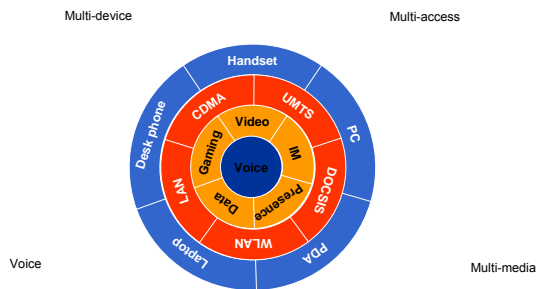
Ubiquitous Broadband, Converged Delivery over IP Why is this happening now?

- Until recently, network bandwidth was inadequate to support broadcast TV and Video on Demand (VoD).
- However, network equipment manufacturers have begun to address bandwidth inadequacies and, as a result, fixed network operators worldwide are now moving aggressively to upgrade their access infrastructure.



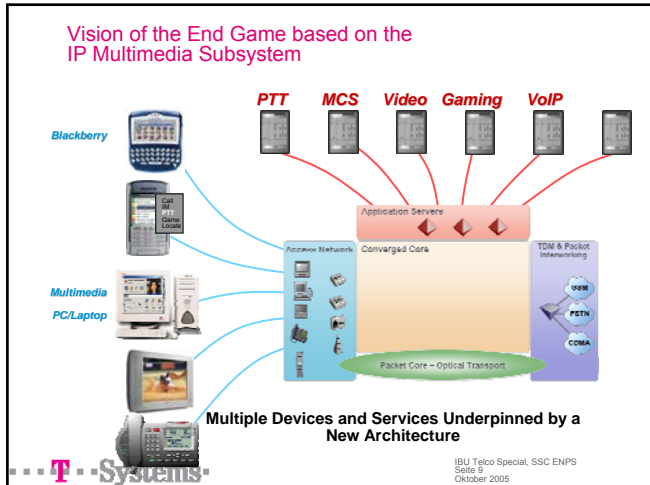
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Service ubiquity / Device Independence



At any time, any service can be used over any device that the consumer desires

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- Triple-Play Networking Requirements**
- Video
 - Low delay and Jitter, loss
 - High bandwidth per subscriber
 - Efficient broadcast/ multicasting mechanism
 - Scalability for VoD
 - Sub-second protection
 - Voice
 - Low delay and jitter
 - Low packet loss
 - Sub-second protection
 - HS Internet
 - Guaranteed bandwidth
 - Ability to burst for excess bandwidth
 - Business services integration
 - Guaranteed bandwidth
 - Low packet loss
 - 50ms protection
 - General
 - Cost performance / efficiency
 - Signaling support
 - Network/service interworking
 - Resiliency architecture support
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- Basic Technology**
- Component technology drives evolution
 - Silicon gets faster, denser and less power hungry
 - More performance with extended battery life
 - Hard drives get smaller and cheaper (Think IPOD)
 - Small drives can hold a full length movie
 - Display technology gets brighter with higher resolution (small and large screens)
 - Data Compression technology eases transport woes
 - Particularly valuable in wireless and video applications
- The power of new terminals will be breathtaking!**
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IPTV = Video Services Plattform

- Live TV
 - Support for point-to-point or multicast distribution (150 SD / 10 HD)
 - Instant channel changing (less 1 s)
 - Digital Video Recording (2 weeks)
- VOD
 - Scalable VOD server architecture (like T-Vision)
 - Leverages common infrastructure with broadcast
 - Capitalizes on commodity server hardware
- Security
 - Multilevel key hierarchy
 - AES stream encryption
 - Flexible rights management
- Operations
 - All components necessary for supporting a video service
 - EPG, SI, SMS, Asset Management, Encoding, Applications...
 - Flexible interfaces to existing OSS/BSS
- Applications
 - Flexible, rich application mechanism
 - Powerful development environment
 - Small client surface area

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DSL Aggregation Network Requirements Change

- Multimedia (video-voice-gaming) services have more stringent requirements
 - 'Always-on' behaviour, meaning no service interrupts
 - Steady image quality and clear toll-quality voice
 - Fast channel browsing / zapping for Broadcast TV



Specific Network Requirements...

- More bandwidth
 - Multicast (zapping)
 - 'Always on'
- More security
 - Better availability
 - High bandwidth
 - Strict quality of service
 - CoS options
 - Delay, packet loss

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examples of integrated telecom+media experiences




On-line gaming with voice chat

Interactive TV with voting

Communication becomes an integral part of the experience of networked electronic media

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„Amigo TV“
 Community Television, the next step for Interactive TV
 = Communication between TV viewers



- Find your friends on TV•
- Use 'Channel presence' to find out what they are watching>
- Talk with your friends•
- Comment on the TV program>
- Share your emotions•
- Change the expression of your avatar (*)•
- Send multimedia messages

(*) Avatar = your graphical presence on TV

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Triple Play Services & Transport Attributes

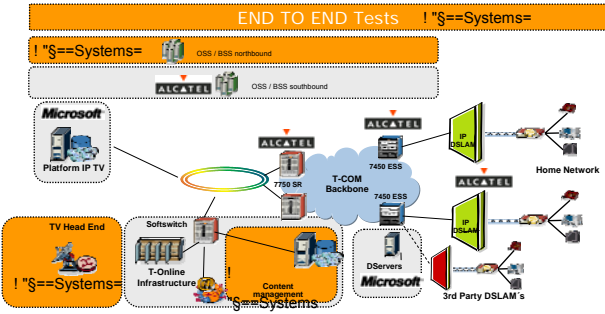
	Service Attributes				
	Modes	Bandwidth	Latency	Interactivity	
Video	Broadcast TV	multicast	channel dependent	RT, low	low
	Narrowcast	multicast	channel dependent	RT, low	low
	Video On Demand	unicast	high	RT, low	med
	Digital Video Recorder	unicast	low-med	Near RT, RT	low
Data	High Speed Internet	shared	high, downstream	NRT, low	med
	Gaming (single user)	dedicated	low	RT, ?	high
Voice	POTS/ VoIP	dedicated	low	RT, low	high
	Multimedia Services	dedicated	low-med	RT, low	high
Other	Gaming (multi-user)	dedicated	med	RT, low	high
	Video Calling	shared	low-med	RT, low	high
	File Sharing	shared/dedicated	high	NRT	high
	Hosted Applications	shared/dedicated	variable	RT, low	high

Network should be optimized for the delivery of video services as it is the most demanding on network resources

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Gesamtarchitektur: IPTV-platform Overview

IPTV RFI.



END TO END Tests ! "s==Systems=

OSS / BSS northbound
 OSS / BSS southbound

Microsoft Platform IP TV

TV Head End ! "s==Systems=

Softswitch
 T-Online Infrastructure
 Content management

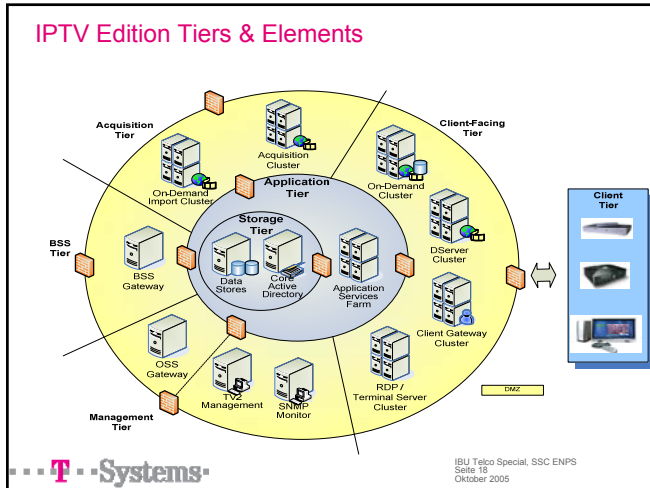
T-COM Backbone
 7450 SR
 7450 ESS
 7450 ESS

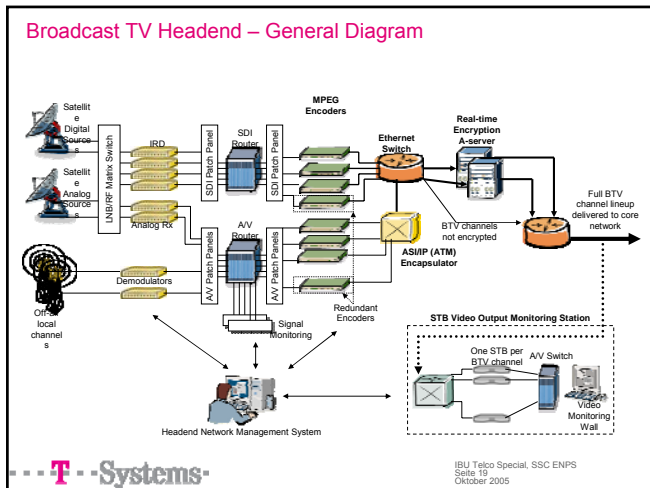
IP DSLAM
 IP DSLAM
 IP DSLAM

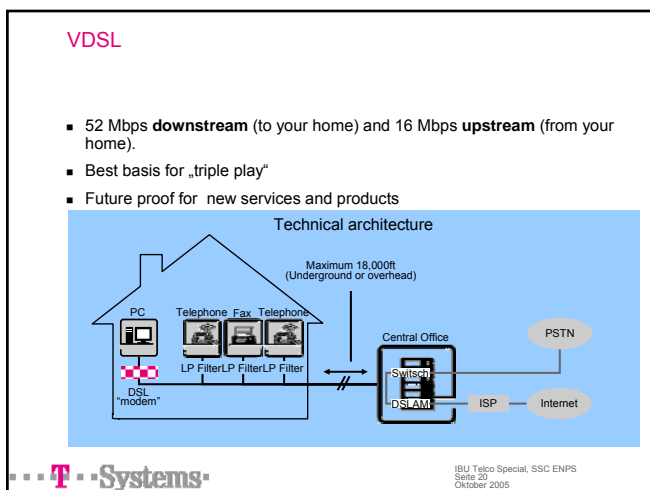
Home Network

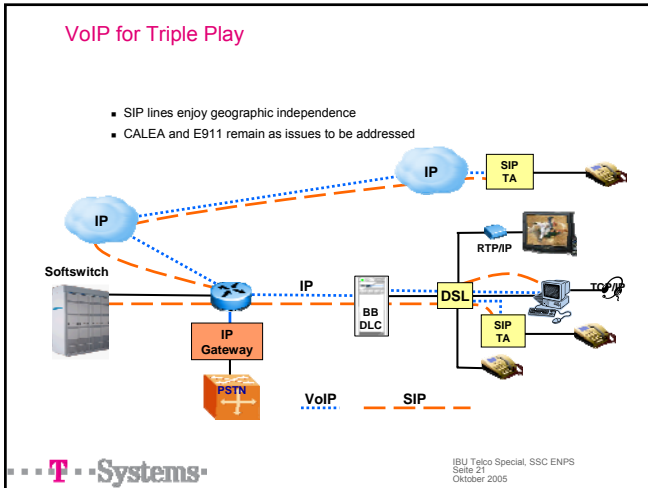
3rd Party DSLAM's

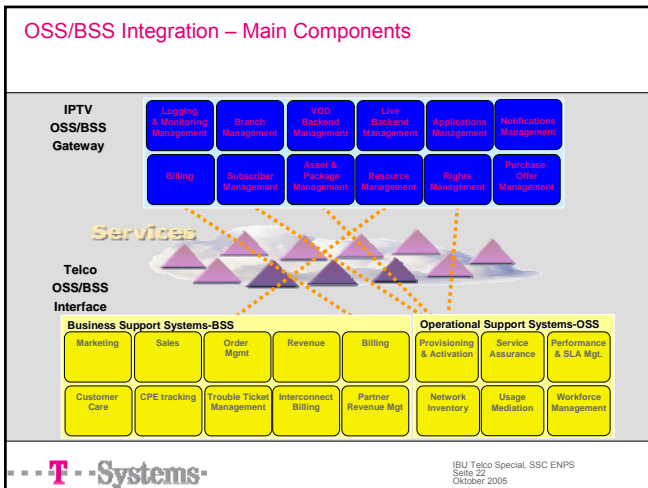
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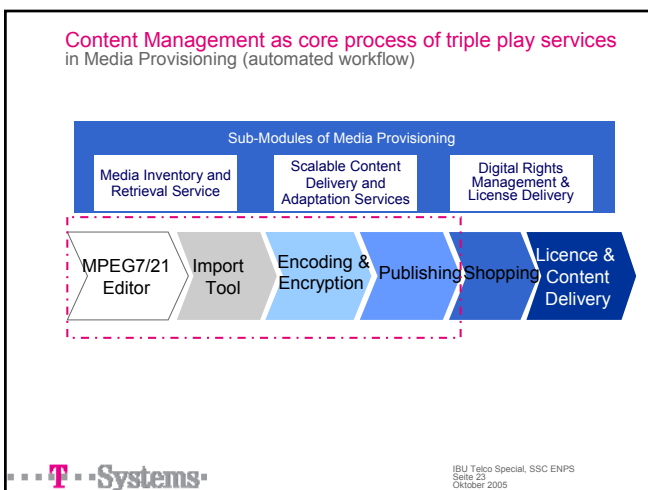












Summary

- Significant new revenue and marketshare at stake with residential triple play services
- Delivery of triple play services create new networking requirements and challenges
- Carrier Ethernet meets these requirements increasing revenue per user and customer ownership
 - QoS, Protection, SLAs, OAM& mgmt
- Carrier Ethernet solutions available in a variety of implementations to suit service provider specific needs
 - Ethernet, RPR, MPLS/PWE3, SONET, WDM, others
