



Hvor mye båndbredde
trenger mediehjemmet?



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14 Februar 2007

Topics

- 1 Market Dynamics
- 2 What consumes bandwidth in the home today ?
- 3 New services
- 4 The bandwidth the home requires

Key Drivers of Market Transition



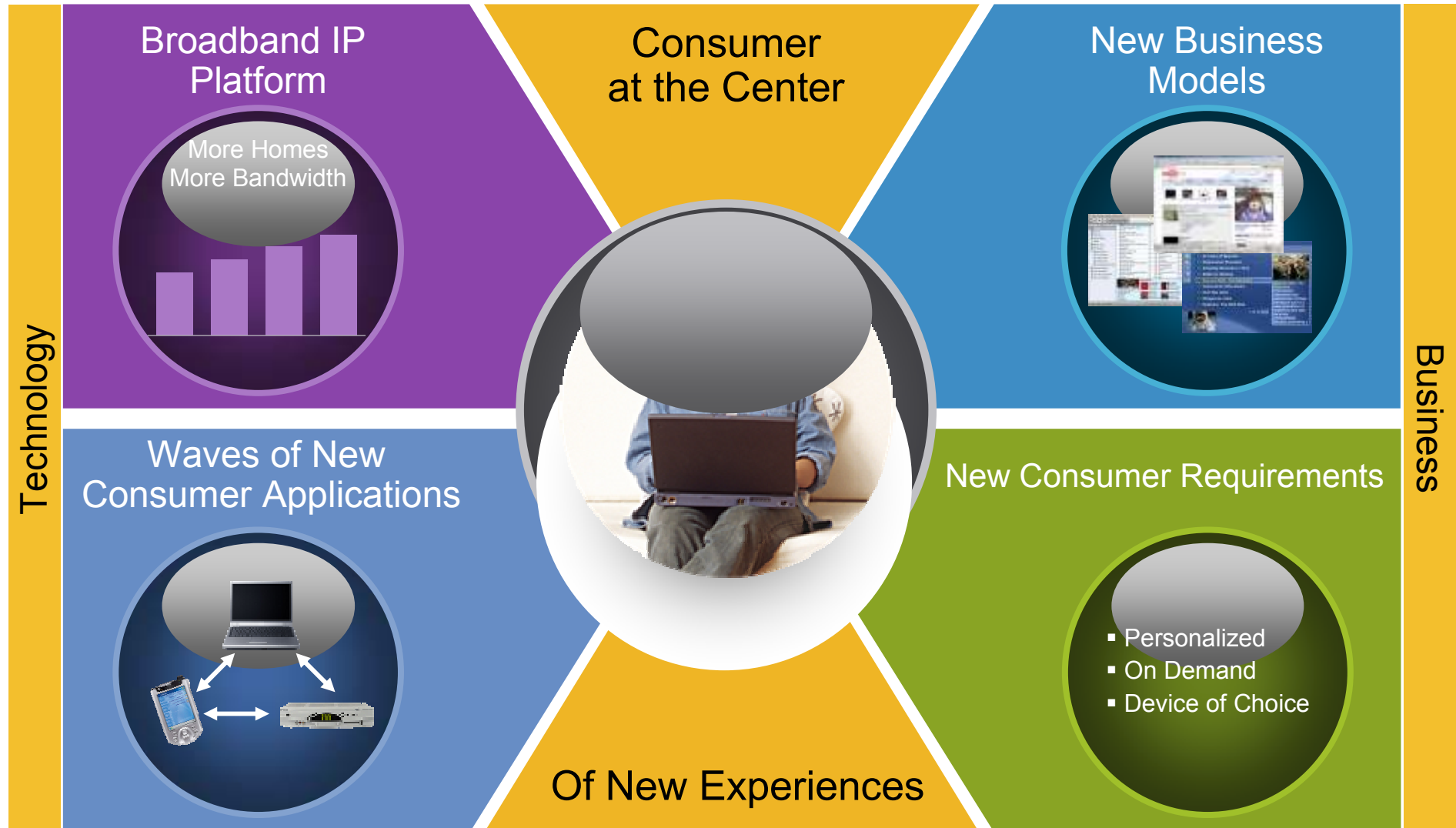
Welcome to a Network Where People Orchestrate Their Own Experiences



Welcome to the Human Network

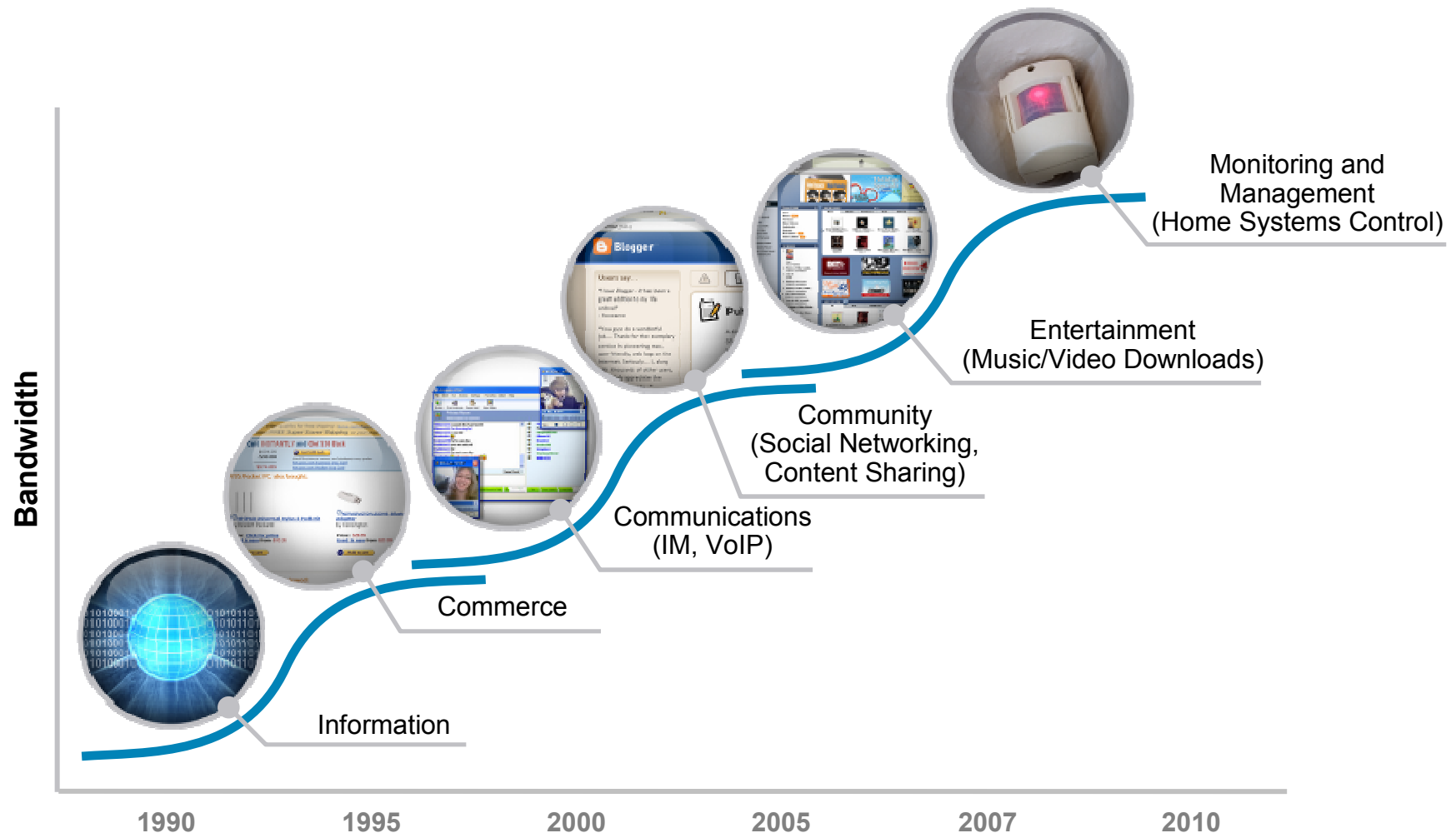
New Market Dynamics

Consumer Is at the Intersection of Four Drivers



Broadband Enables Waves of New Consumer Applications

The Internet Has Evolved From Primarily a Source of Information to the Platform for All Types of Applications



Broadband Enables New Business Models

Service Provider to Experience Provider

New Distribution Channels



- Micro-channels tuned to community interests
- Long-Tail content delivery

New Service Opportunities



- “Transparent” connected home management
- New entertainment value chain

New Advertising Platform



- Enhanced segmentation, targeting and measurement
- Rich-media ad units
- Consumer opt-in reduces noise

New Content Opportunities



- Ways to differentiate and monetize content
- Interactivity
- Give user control over viewing experience

Enables More Revenue and Means to Differentiate Offerings in the Marketplace

All types of services requested



"Nurse, get on the internet, go to SURGERY.COM, scroll down and click on the 'Are you totally lost?' icon."

Predatory Services – Over the Top

New and non-traditional competitors are expanding their presence into consumer video and more



New Opportunity for SPs - Partnership Delivery & Control

NGN Access Provider

- Guaranteed delivery
- Customer's agent/intermediary
- Simplicity, reliability and trust/security.

Over The Top

- Innovation
- Leverage partner strengths (e.g. brand, content relationships)
- Enhance regulatory position

Broadband is Changing Consumer Expectations

What They Want



- More Choices
- More control
- Personalized to user

When They Want It



- On Demand,
- Always Available

Where They Want It



- Wherever the network is
- Every room in the house
- On the go

How They Want It



- Any Device connected to the network
- Flexible

**What consumes
bandwidth in the
home today , and
what about
technology ?**

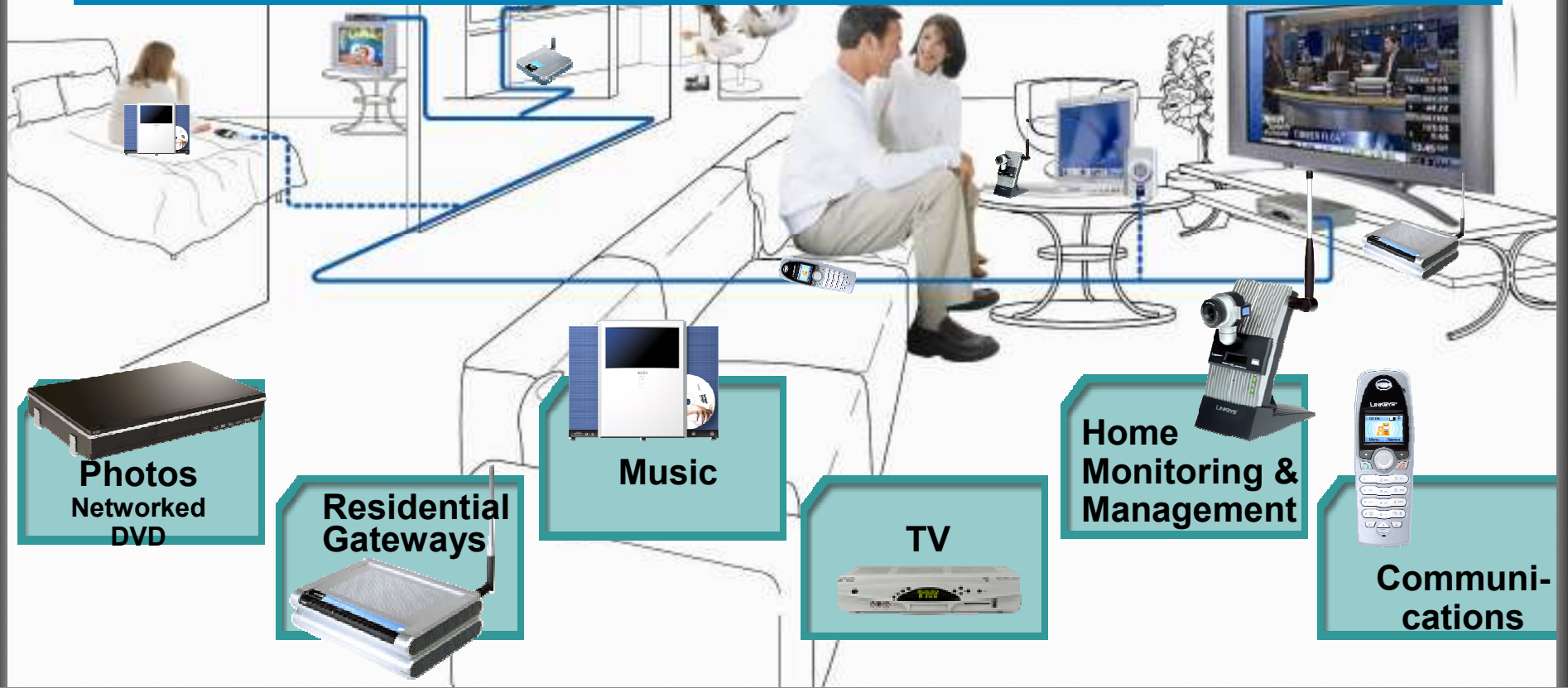


Connected Home Solutions

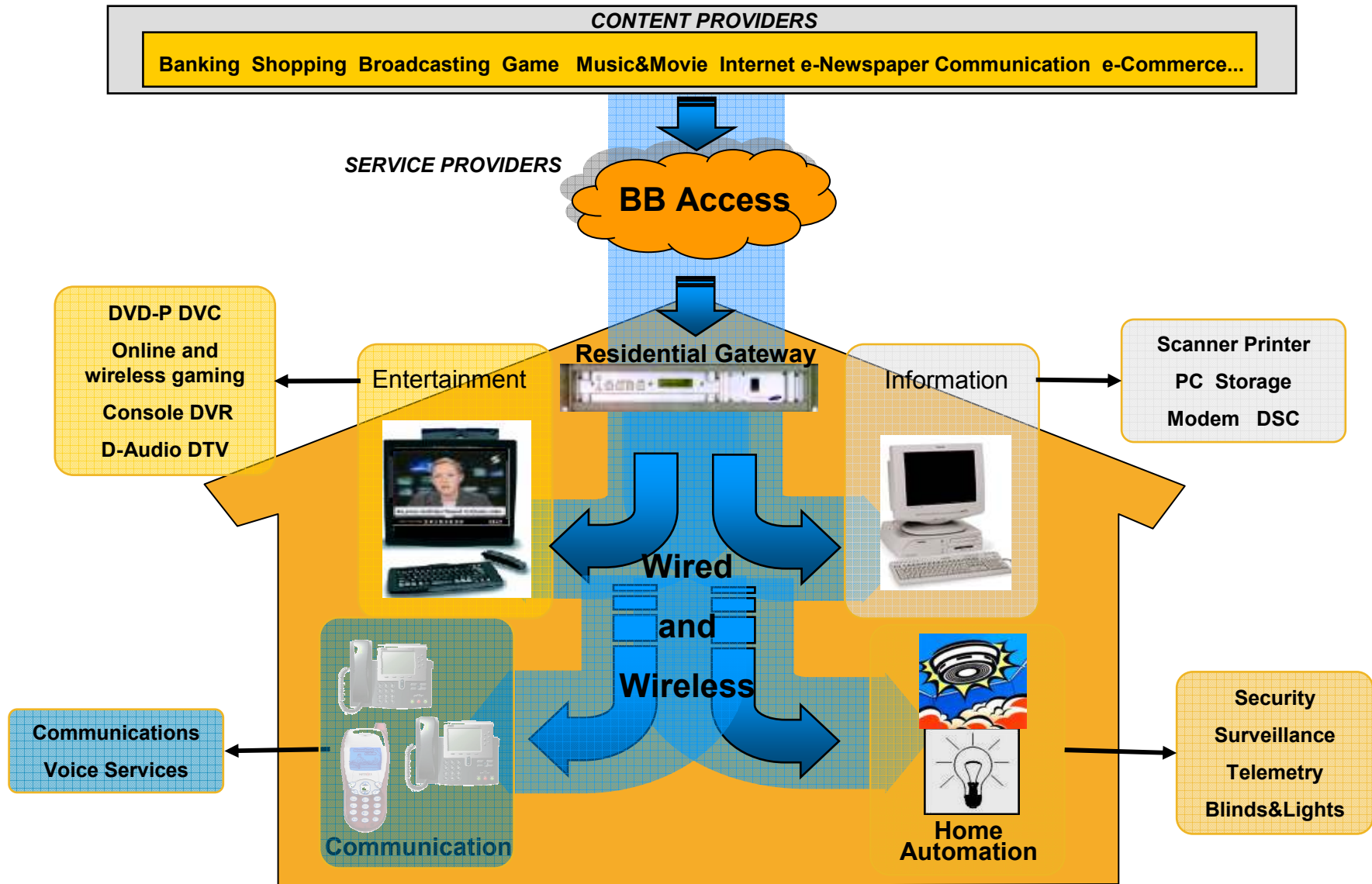
Generating Demand for more bandwidth upstream and downstream

Different ways the content will come to the home:

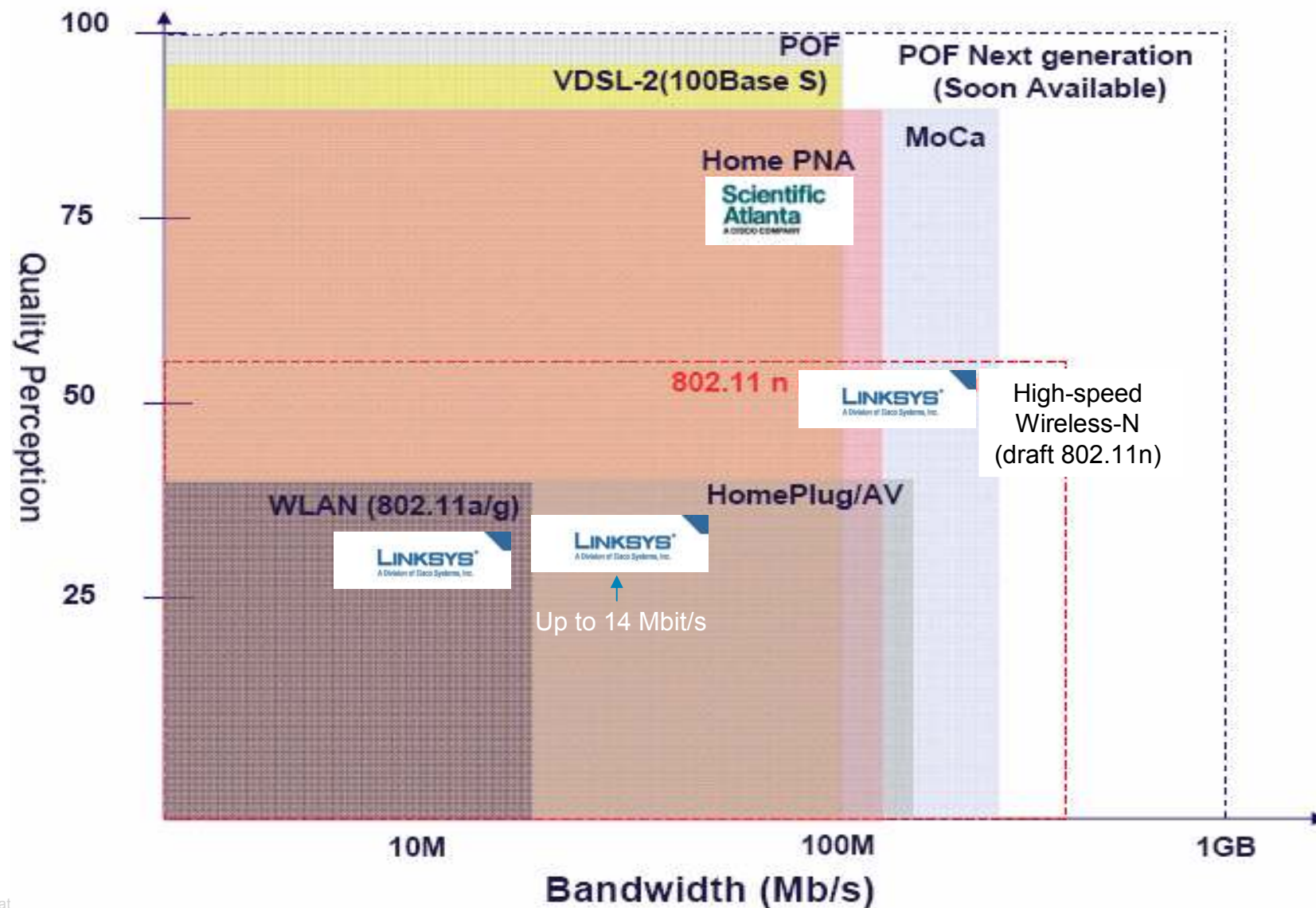
- SPs
- Over the Top Players like Google, Vonage, Skype, Apple, Ebay etc.
- Directly from Media Companies
- Content aggregators



Setting up a Home Network beyond High-Speed Internet



In House Technology Options



Wireless-N Gigabit Gaming Router

- **WRT330N**

Internet-sharing Router and 4-port Gigabit Switch, with a built-in speed and range enhanced Wireless Access Point

Optimized for time-sensitive applications to provide reduced game lag and cleaner sounding VoIP calls

MIMO technology uses multiple radios to create a robust signal that travels up to 4 times further and reduces dead spots

Up to 12 times faster than Wireless-G, but also works great with Wireless-G and -B devices



For those who enjoy **online gaming or Internet phone service** and want fast wireless access from anywhere in the home, the Wireless-N Gigabit Gaming Router is a **high performing** broadband router optimized to deliver the highest possible **quality of service** for gaming and voice applications while also managing email and web surfing traffic at the same time.

PowerLine AV Ethernet Adapter

- **PLE200 (and PLK200 kit)**

Enables networking over existing power lines in the home (No New Wires)

Up to 200Mbps data rates with >100Mbps TCP

Suitable for HDTV, Networking, VoIP

Backward compatible to HomePlug 1.0 – **standards based**

Simple Plug-n-Play Installation

Works out-of-the-box

Pre-encrypted, user can change key with included software



For those who want **fast, hassle-free** wireless Internet access all over the house without range extenders or new wires, the Powerline AV Ethernet Adapter **easily turns existing electrical power lines into a high-speed, high-capacity** network that can also stream large files or **HD content** with superior quality, unlike other adapters that can be affected by electrical “noise” in the home.

Network Storage System with 2 Bays

- **NAS200**

Share, Expand, and Secure your valuable content
Plug and Play expandable network storage with
built-in security

Two hard drive bays and two USB ports to add
more space as your storage needs grow

**Secure access to files from outside the
home**

Single button backup option

Access files anytime without a dedicated PC on

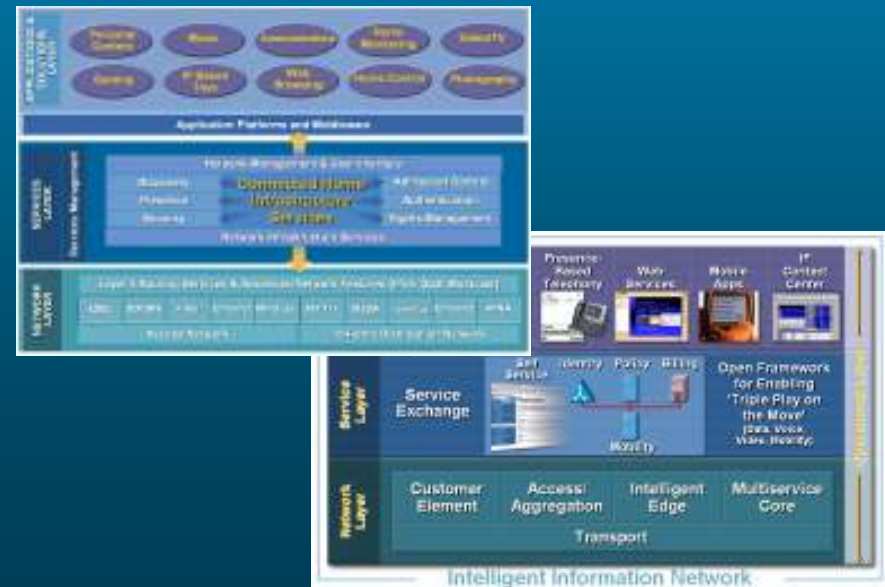


For those with a **large collection** of music, photos, videos or other files and want to be able to access files from more than one computer in the home, the Network Storage System with 2 Bays is an **expandable network storage** appliance that easily adds storage space to a home network and stands alone **without needing a PC** on, for anytime access in the home, and secure **access from outside the home**.

Making the Network “Human”



Connected Home Architecture



Service Provider Network Architecture

New Services



Enabling New Content and Services Leading to New Consumer Experiences



High speed internet access a competitive advantage.



Trend for access bitrates

- Race between application requirements and technical capabilities
(remember evolution of PC capabilities?)
- Bitrate increase justified video streaming applications
(some SDTV and one HDTV stream per household + VoIP + Internet)
- Do we really anticipate future bandwidth requirements?
 - video download rather than streaming
 - video e-mail
 - joint video editing
 - telepresence (concurrent voice, video, application sharing)
 - 3D video
- It is about video in all its forms ...

TelePresence: High-Definition Video... Consumer → Business



BusinessWeek



"The Best of 2006"

"Has opportunity to change the way people interact with one another."

— Yankee

"This is a dream come true."

— BusinessWeek

"It's like comparing traveling on a train vs. a jet plane."

— CRN

TelePresence in the future... at Home



WEB 3.0 (9 feb 2007, digi.no)

- IBM mener at Web 3.0 vil bli 3D-verdener
- Alle prater om Web 2.0, men IBM har løftet blikket og satser tungt på å bli ledende i neste bølge. Web 3.0 blir 3D, mener IBM.

Second Life og lignende 3D-verdener.

Gartner mener at virtuelle verdener har et stort potensial. Muligheten for å samle store eller små arbeidsgrupper gjennom en virtuell interaksjon der innholdsformater som audio og video kombineres med muligheten for å være tilstede fremheves i Gartners analyse.

- Hva dette vil gjøre for båndbreddebehovet i mediehjemmet kan vi foreløpig bare drømme om.

Bill Gates spår at alle vil ha roboter

- I en artikkel hevder Gates at han mener roboter er den neste store bølgen.

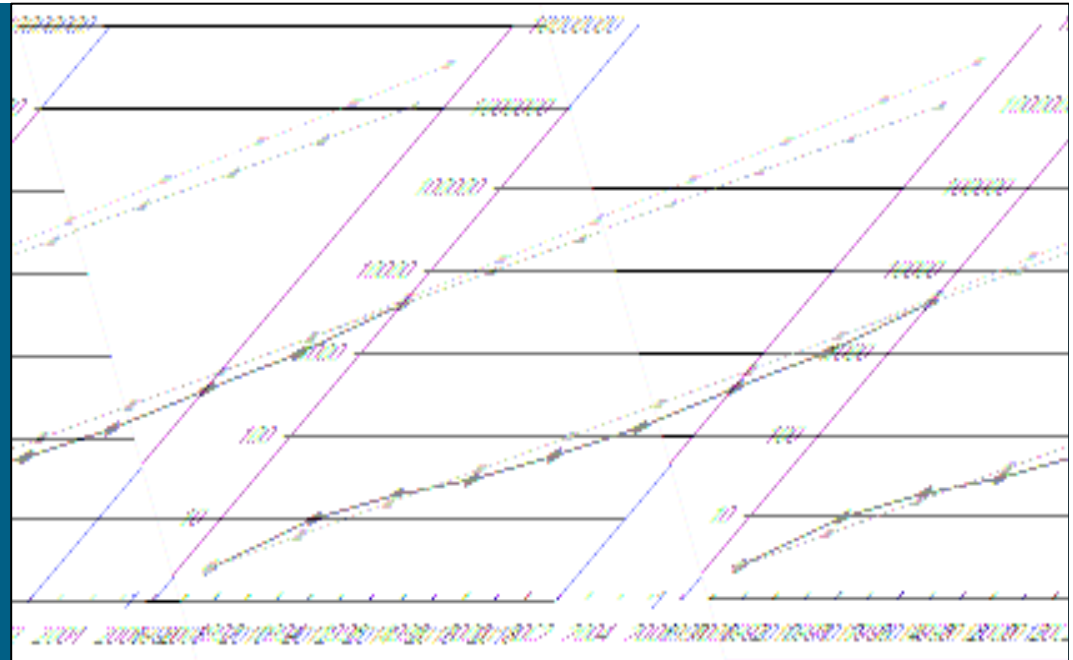
De fleste i den rike verden vil snart ha en eller flere av det vi i dag kaller roboter, spår Gates og trekker frem:

selvgående støvsugere,
sikkerhetsrobotoer,
sykpleie-roboter,
klesbrette-maskiner.

Kjøpe en DVD ?

- Enkelt eksempel: Ønsker å kjøpe en 10GB DVD.
- Laster du ned på en 5Mb/s linje tar det minst 4,5 timer (uten tanke på overhead). I realiteten er ikke dette en aktuell tjeneste idag fordi nettene er for dårlige.
- På en 1Gb/s linje snakker vi om et par minutter. Plutselig er det blitt en interessant tjeneste.

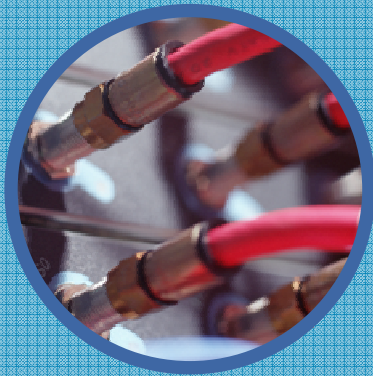
The Bandwidth the home requires



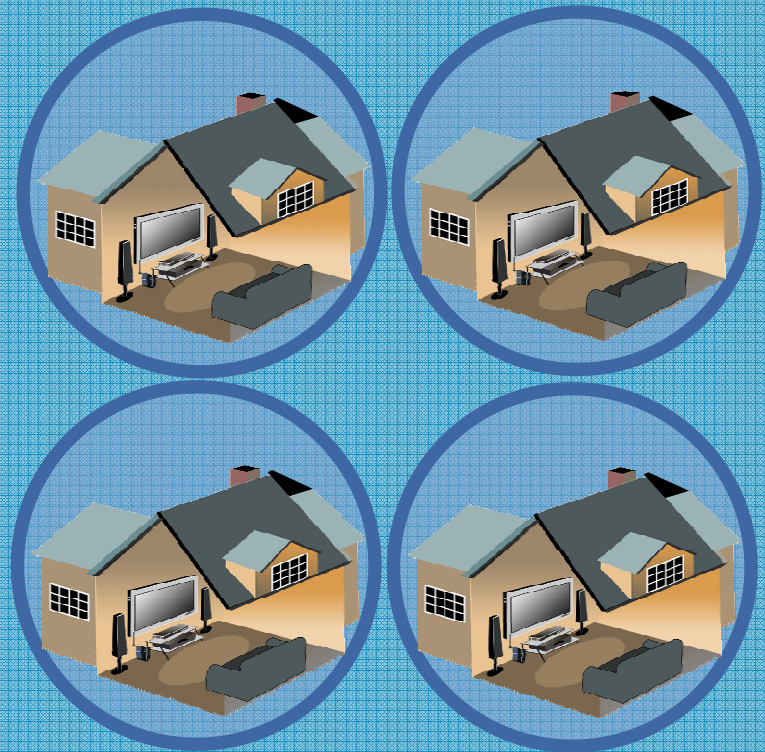
Bandwidth Demand 1995-2010

The Internet Changed the Way We Live, Work, Learn, and Play

Within 2010, four average family homes will consume the same bandwidth as the complete world wide internet did in 1995.



WW Internet 1995



Trend for access bitrates (2)

- Bursty ultra-high-speed communication vs. real-time streaming

It is less about throughput but more about latency

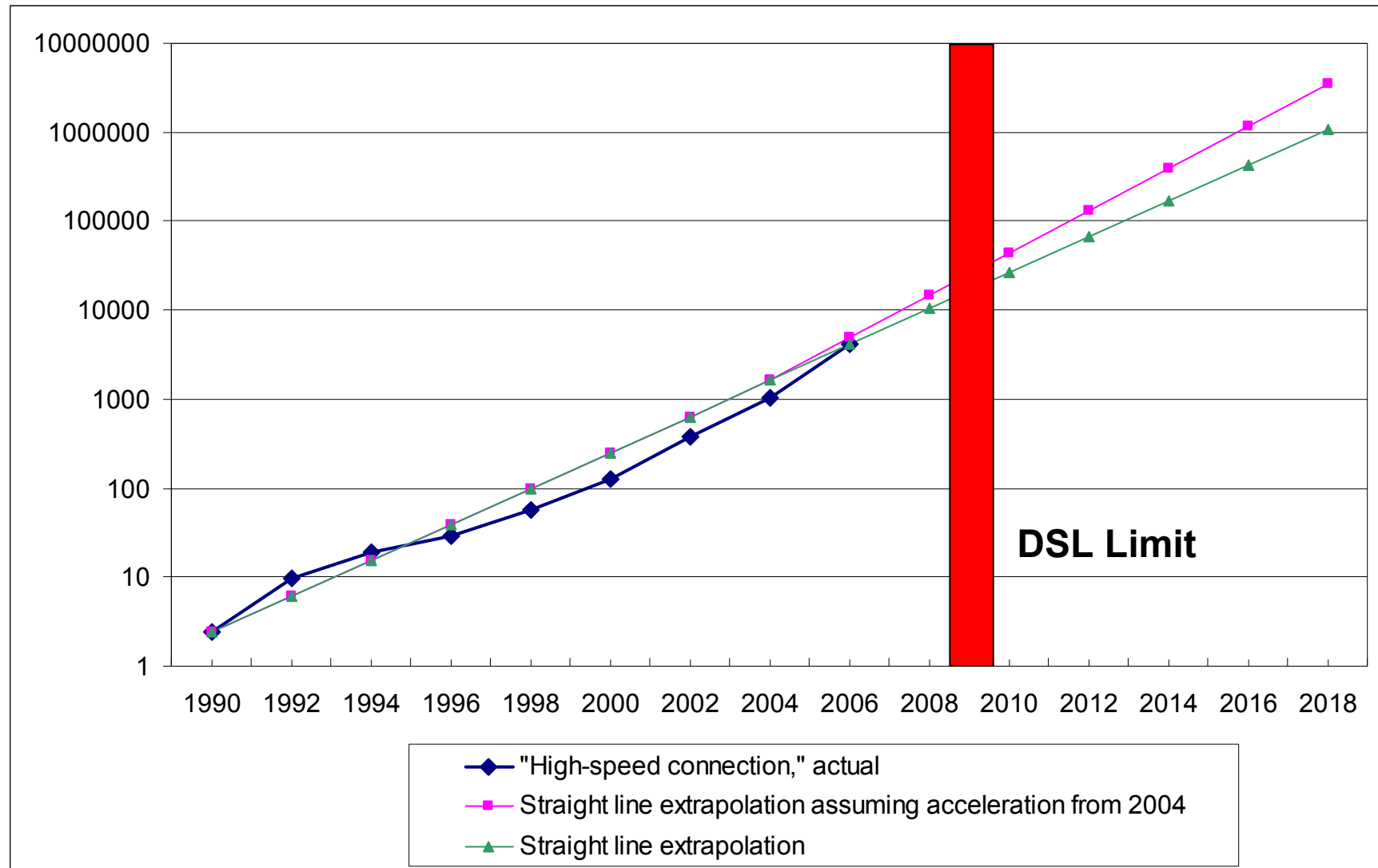
=> statistical multiplexing is feasible

=> resource allocation challenges:

simultaneous streaming with guaranteed bitrates and bursty data

- 100 Mbit/s available in a large number of networks in Scandinavia, NL, France, Austria, ...
- 1 Gbit/s residential access already available in Hong Kong and Sweden and expanding its coverage quickly

Trend for access bitrates: exponential growth



Source: Heavy Reading report "FTTH Worldwide Market & Technology Forecast, 2006-2011"

**I de neste årene vil mediehjemmet ta all den båndbredde vi kan stille til rådighet.
Hovedproblemet vil være peak rate behovet.**



Welcome to the Human Network

