

From POTS to Pipes: Anticipating the Customer Needs and Wants

Evolving the Network to IP Services

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www.cellstream.com



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-
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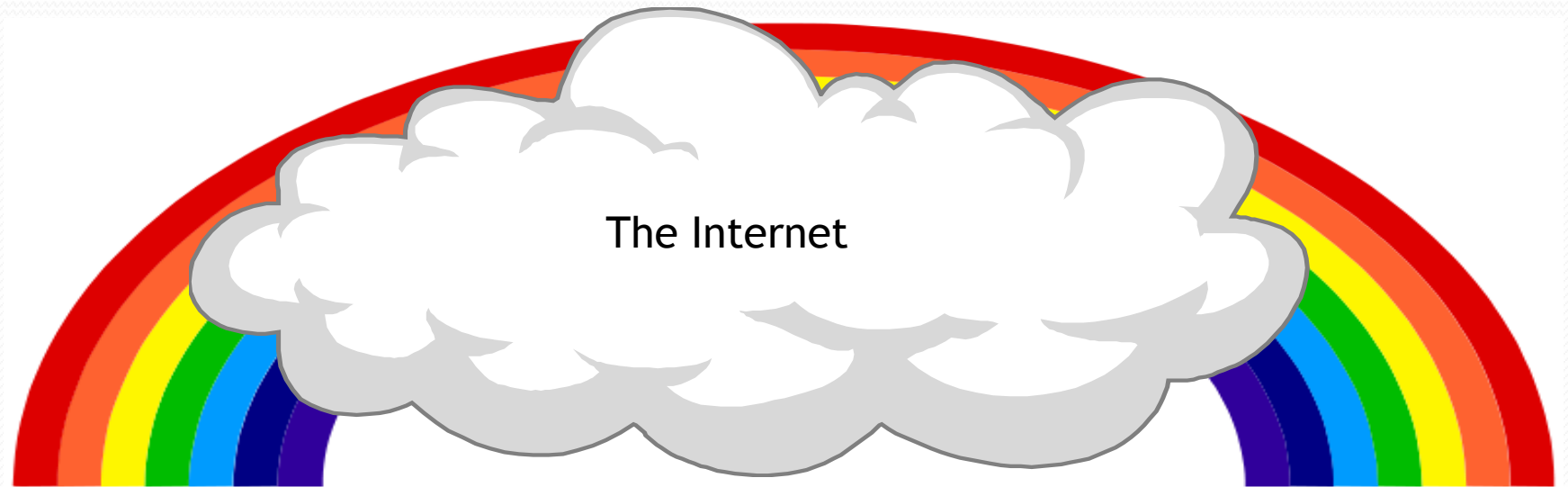
What will the Customer Demand?

- “Mobility”
- “Bandwidth”
- Performance
 - Do they get the speed they are paying for?
 - Do the games and video work?
 - Is the phone better than the cell phone?
- This means “convergence” of voice, video, data with “Quality of Service”
- Need to define who the customer is



Connectivity Today - 2010

- Does a POTS (Plain Old Telephone Service) Line mean: “truly connected”?
- 21st Century connectivity requires more than a POTS line -- requires a “pipe” to the information and services offered by the Internet Cloud



Past vs. Present



The Past – 20th Century

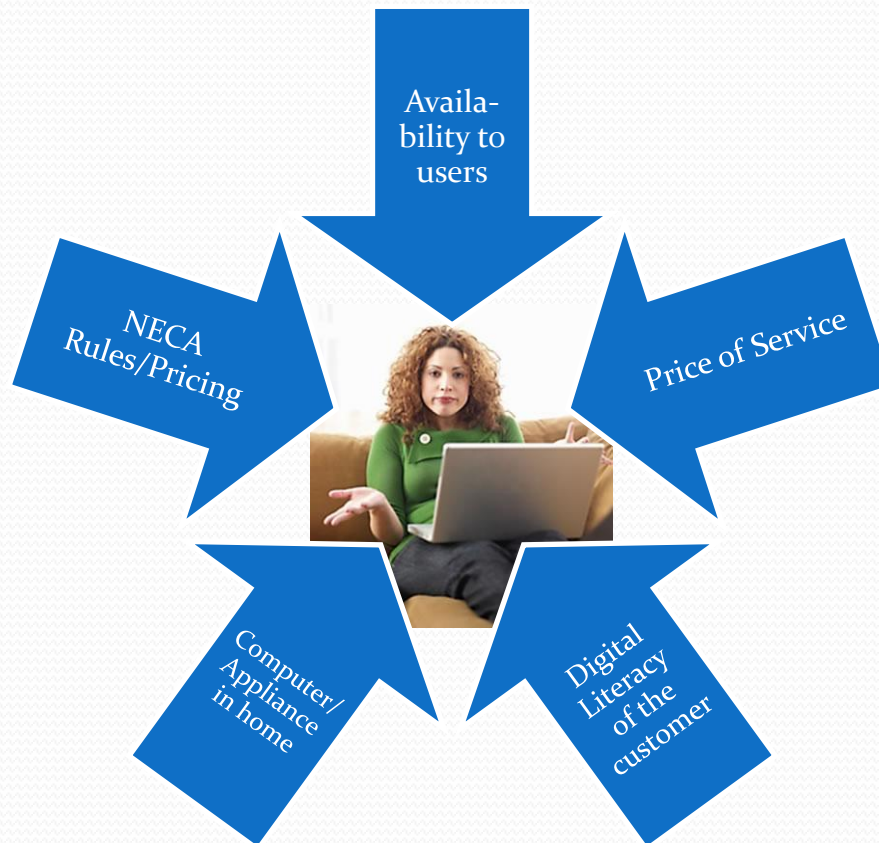
- Peer-to-Peer with broadcast
- Mix of Analog and Digital
- Producers supply Consumers
- Peer-to-Peer is 1:1
 - Traditional Telephone
- Broadcast is 1:N
 - Newspaper
 - TV/Radio

The Present – 21st Century

- Many-to-Many with multicast
- All media is digital – single transport
- All media is connected
- Many-to-Many is M:N
- Producers and Consumers do both
 - CNN takes reports from Twitter
 - End users send pictures and reports

“Take-Rate”

- The rate at which users adopt broadband



Broadband Adoption Rate Data

Percentage	Year	Source	Data Methodology
63%	2009	Pew Internet and American Life	Phone Survey of American households and adults
64%	2009	Pike & Fischer	Subscriber counts from industry reported information
63%	2008	Forrester Research	Mail survey of American and Canadian households and adults
67%	2008	Nielsen	Phone surveys

Sources shown

Broadband Impact Zones

Employment

- 77% of Fortune 500 companies did not give job seekers an option to respond offline (in 2005)
- The Want Ads are essentially disappearing before our eyes

News

- 40% of Americans get their news from the Internet
- Newspapers are closing; the Wall Street Journal is three inches narrower than it was in 2004

Education

- 65% of teens go online to complete homework
- 71% of teens use the Internet for project research
- Wikipedia is approved at most Universities as a reliable source

Healthcare

- 61% of American adults have searched for health information online
- 60% say the online information affected their decision on treating an illness or condition

Online Consumerism

- Car buyers who research on the Internet typically pay less
- Can buy things online that have not “brick and mortar” stores

Impact to Non-Adopters

Employment

- Getting a job is more difficult without online information
- Even knowing jobs exist is not possible

News

- Current event access is diminishing daily
- TV news is reporters interviewing reporters
- Less connected, less aware

Education

- Lower grades for students
- Limited to missing access to scholarships, applications, news, calendars
- No mastery of the tool

Healthcare

- Limited knowledge, difficult to research information
- Limited choices and care options

Online Consumerism

- Pay more
- Make less informed choices
- Miss access to certain products/services

Technology Neutrality

- Everyone agrees that technology neutrality is key as technologies are rapidly changing
- Not the same as “Network Neutrality”
- Users are technology neutral (best service at lowest price)
- Service Providers should be neutral (best service at least cost)
- Rules makers should be neutral (open doors, provide neutral frameworks)



Challenge of Technology Neutrality

- FCC today leans heavily on Wireless
 - Size of the wireless market and it's growth
 - Often take position they have fostered this success
- Wireless spectrum auctions generate large revenues
- Overlooked is consumers and manufacturers have been the success stories for wireless
- Wireless technology is evolving in <12 month cycles
 - Prediction of costs, capabilities in 5 years nearly impossible
 - User driven market – prices dropping like rock
- Key will be to balance wireless and wireline providers and services



Definition of Mobility



Truly Mobile User

- Interface to Network is strictly wireless
- Voice/Data/Video can be bundled and separated
- Highly dependent on service platforms – users will eventually tire and demand more universal services
- Bandwidth in 4G should be enough
- Wireless handset becomes the “tether” for when in office/home

Semi/Non-Mobile User

- Interface to the Network is Wi-Fi (fixed wireless for appliances, high bandwidth for access)
- Speeds expected ~ 100Mb/sec
- Will get services from “the cloud”
- Hard to sell anything but Bandwidth
- Selling QoS would be good, but regulations are behind

Wireless 3G vs. 4G

Technology	3G	4G
Frequency band	1.8 - 2.5GHz	2 - 8GHz
Bandwidth	5-20MHz	5-20MHz
Data rate	Up to 2Mb/s	100Mb/s moving - 1Gb/s stationary
Access	W-CDMA	VSF-OFCDM and VSF-CDMA
FEC	Turbo-codes	Concatenated codes
Switching	Circuit/Packet	Packet

FCC BB Plan Bandwidth



- FCC Broadband Plan currently requires two profiles:
 - 4 Mb/sec for rural customers
 - 100 Mb/sec for non-rural customers
- To be achieved over next 10 years for wireline and 7 years for wireless networks
- FCC claims data supports these numbers:
 - 4 Mb/sec is driven by majority usage data today
 - 6% of users use 10 Mb/sec or more today
- These speeds are already obsolete
- Why the difference?
- How do you migrate a system delivering 256 Kb/sec to 4/100 Mb/sec (no answers)
- Don't price and availability impact data?
- 10 years ago, who predicted MySpace or Facebook?

NATIONAL
BROADBAND PLAN
CONNECTING AMERICA

Wireline Broadband Exploding

- Comcast has recently announced a 105 MB/sec - \$200/mo service
- Chattanooga, Tennessee is about to get the fastest municipally provided Internet and IP video service in the United States. Chattanooga's promises that its residents will soon be able to buy "Fi-Speed Internet 150" —fiber-to-the-home broadband with down and upload speeds of 150Mbps
- Verizon just announced XG-PON, promising performance of up to 10Gbps downstream and 2.5Gbps back up to the Internet, over existing fiber. Testing figures showed that XG-PON enabled the receiving PCs to reach speeds of over 900Mbps in a performance test

How Many Bits?



- 100,000,000 (100M) Households
- 100,000,000 (100M) Bits/Sec
- = 10,000,000,000,000,000 Bits/Sec Total Bandwidth
- 10,000,000 Gigabits/Sec
- 10,000 Terabits/Sec
- 10 Petabits/Sec

- 1 Bit = Binary Digit
- 8 Bits = 1 Byte
- 1000 Bits = 1 Kilobit
- 1000 Kilobits = 1 Megabit
- 1000 Megabytes = 1 Gigabit
- 1000 Gigabits = 1 Terabit
- 1000 Terabits = 1 Petabit
- 1000 Petabits = 1 Exabit
- 1000 Exabits = 1 Zettabit
- 1000 Zettabits = 1 Yottabit
- 1000 Yottabits = 1 Brontobit
- 1000 Brontobits = 1 Geopbit

Note: Just considering the Urban numbers

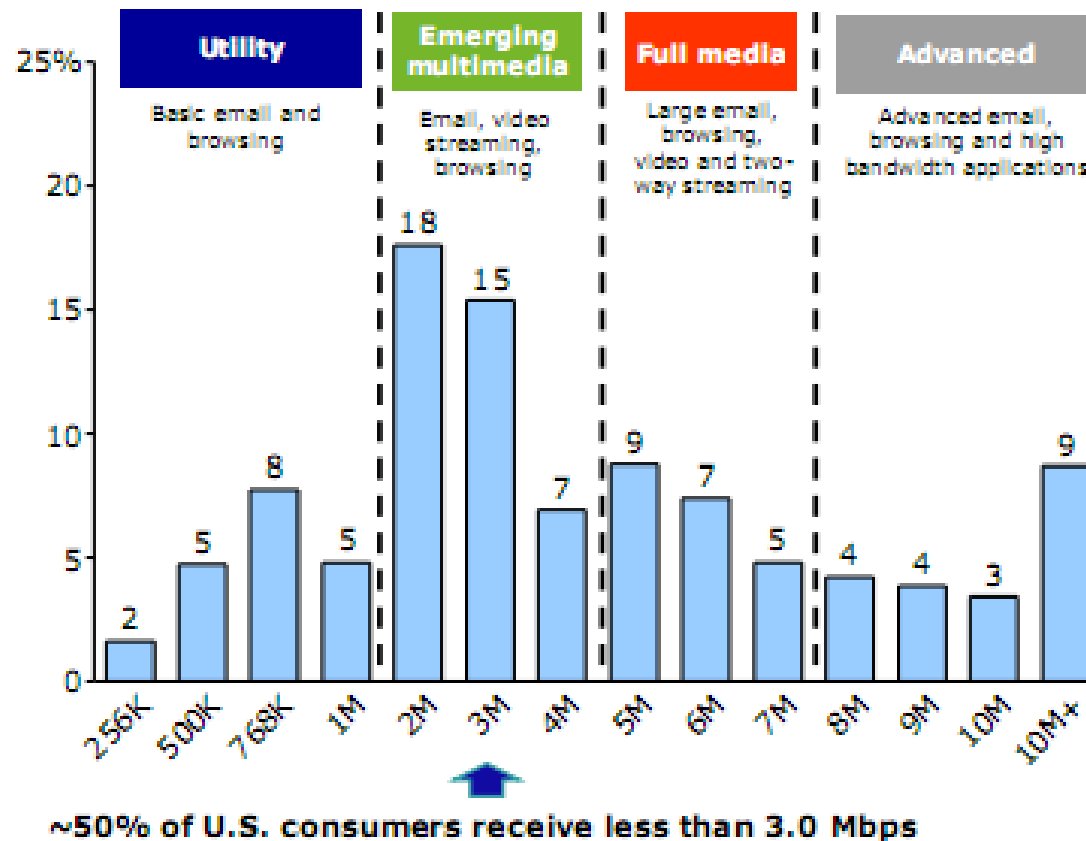
How Many Appliances?

- Combine Wireless and wired connectivity with all the appliances, and things get busy
- This requires more bandwidth
- What are the appliances your customers will need?
- What things will impact their needs?
- An opportunity to up-sell



How Much Broadband Speed?

Percent of subscribers by ACTUAL top speed received



Source: comScore September 2009 panel

Defining Customer Types

- Some will want plain old telephone service (Lifeliners)
- Some will want just cell phones (new Jet Set)
- Most will want a blend of the services we have discussed – Voice/Video/Gaming/Internet

- Drives one thing...hint – the thing we sell....

BANDWIDTH

Selling Bandwidth

	FCC Survey Results
Education	71% of teens say Internet has been primary source for recent school project
Jobs	Those offline find it increasingly harder to search, train, and apply for jobs
Small Business	Many small businesses don't have connectivity sufficient for new opportunities, like cloud computing
Health Care	Finding medical information without online access limits patients' knowledge, choices and care
Economic Development	Current broadband access in many places insufficient to attract new investment
Consumer Welfare	Offline consumers face knowledge and cost gap

Source: FCC Broadband Task Force, September 2009

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Drivers to Internet Broadband

- Utility of the Internet
 - Capabilities we rely on for communication and knowledge
 - Ease and privacy of use
- Offline applications have become bigger and better online applications
- Supporting/upgrading applications has moved away from the user responsibility
- Applications have become predictably dependent on more and more bandwidth



End User Services

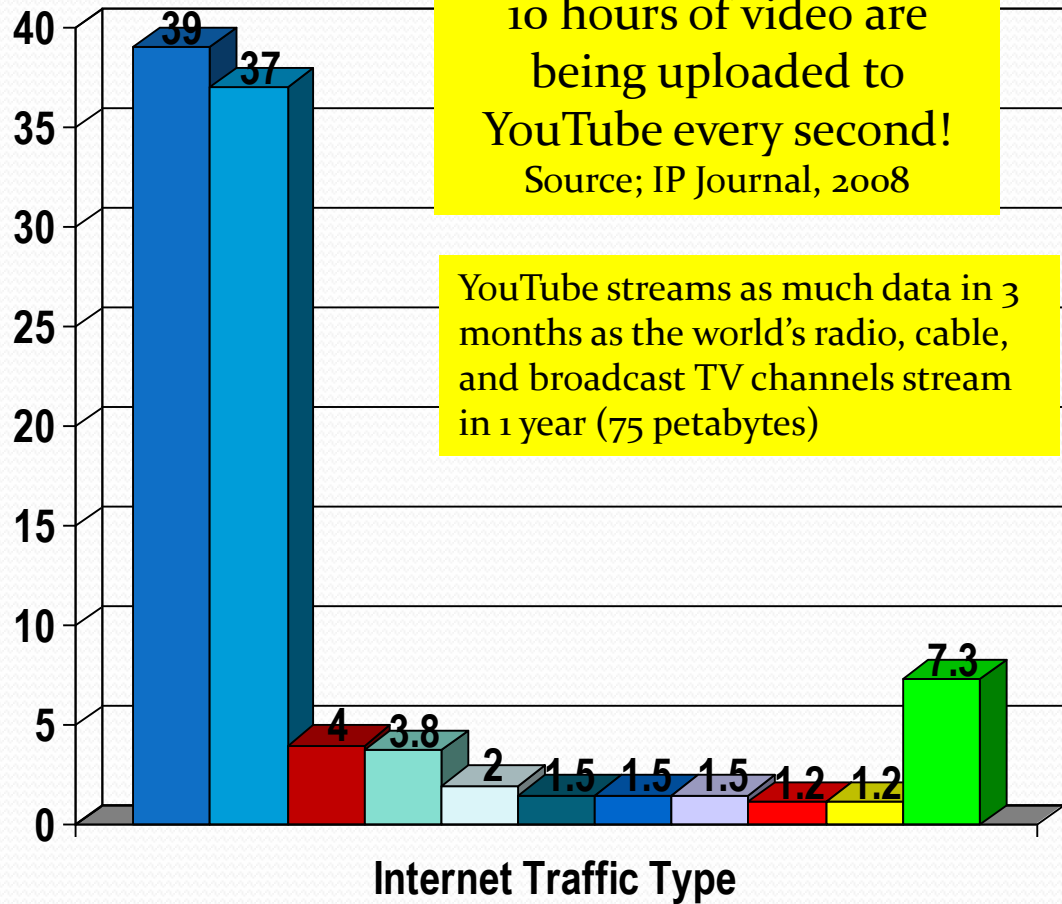
- Approximately 3 television viewing points ————— 3 x 10 Mb/s (HDTV/MPEG-4)
 - These can be live/or Video on Demand
- Internet Access ————— 3 x 10 Mb/s
 - Includes on-line Gaming and other Internet needs
- IP Telephone ————— 1Mb/s

TOTAL ~ 60Mb/s

Note: Should consider other applications for SOHO (video conferencing), Small Business (Security Camera monitoring), etc.

What is 'on' My Internet Network?

- Web Downloads (YouTube, Google Video)
- P2P Networking
- VPN Traffic
- Streaming Media
- E-Mail
- Skype/VON/VoIP
- FTP
- News



10 hours of video are being uploaded to YouTube every second!
Source; IP Journal, 2008

YouTube streams as much data in 3 months as the world's radio, cable, and broadcast TV channels stream in 1 year (75 petabytes)

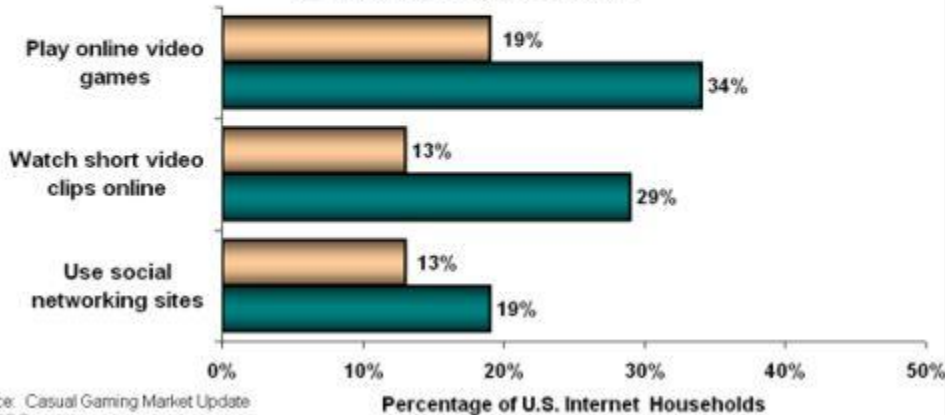
Source: Ellacoya Networks
Numbers are percentages

What is Peer-to-Peer?

U.S. Consumers Play Online Games More Often Than Watch Online Videos or Visit Social Networking Sites

"How often do you do the following activities?"
(Among internet users 18+, n=1,000 in 2007 & n=1,751 in 2006)

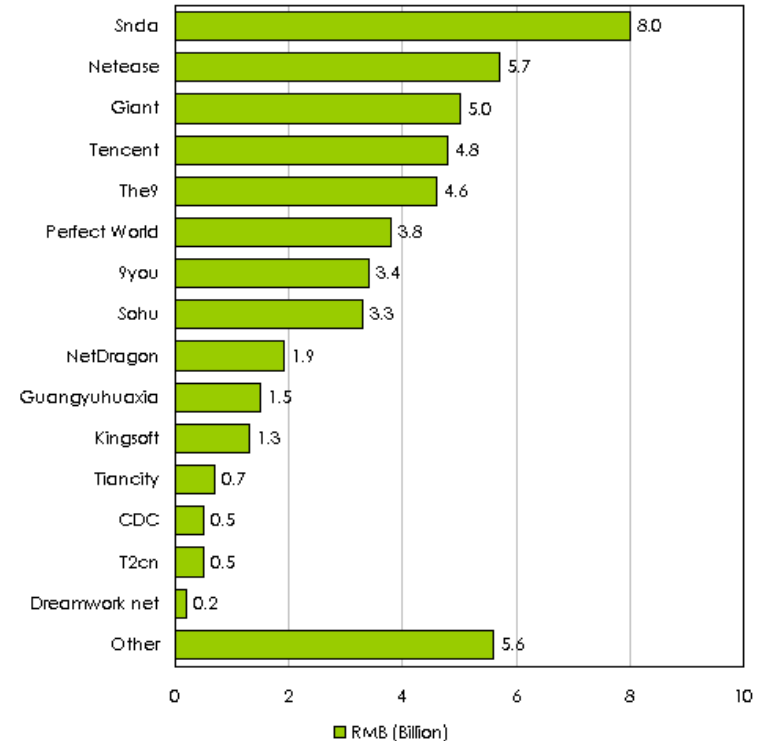
■ At least weekly in Q2 2006
■ At least weekly in Q2 2007



Source: Casual Gaming Market Update
© 2007 Parks Associates

On Line Gaming

08Q2 Chinese online game market size Top 15



Note: 1. Chinese online game market size was 5.08 billion RMB Q2, 2008

2. Quarterly market size was estimated according to operators total income from online game related businesses, just for reference.

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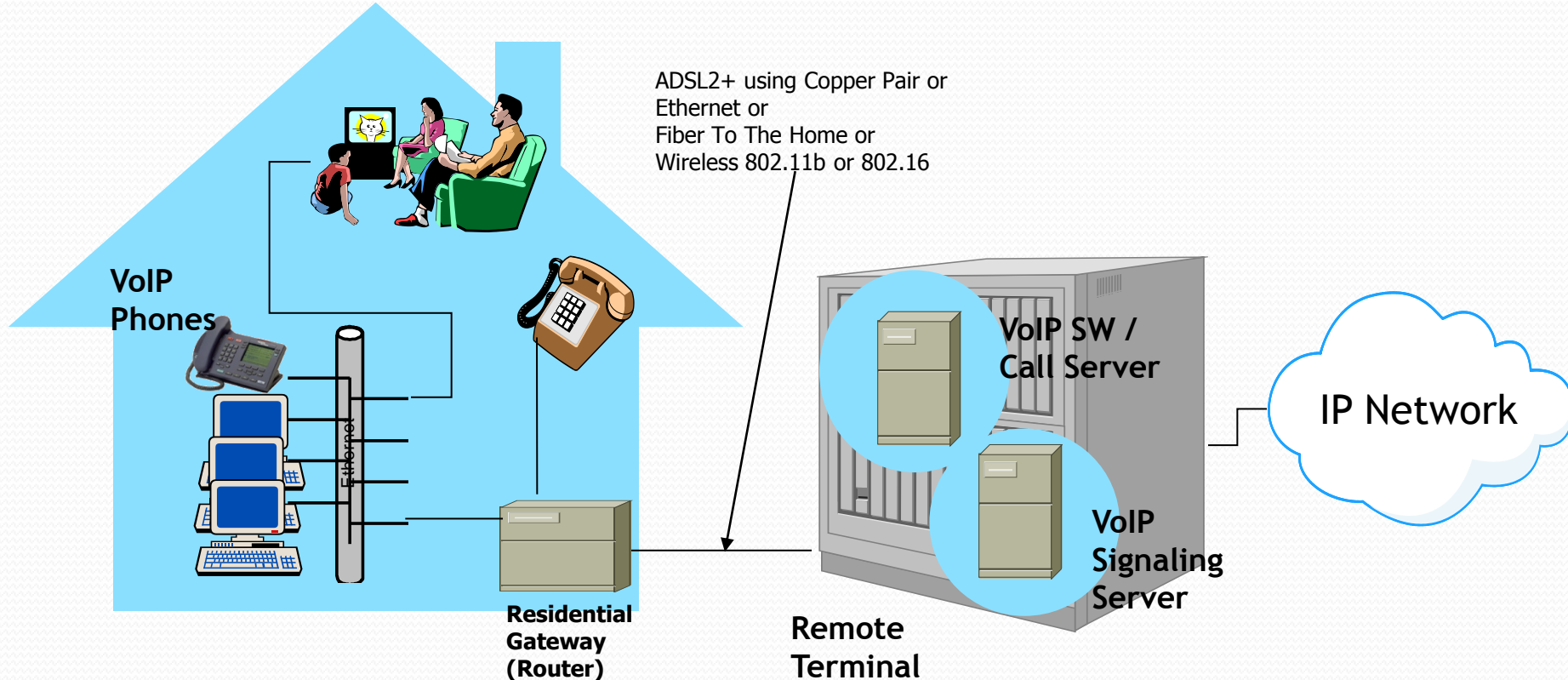
www.iresearch.com.cn

Consumer Concerns



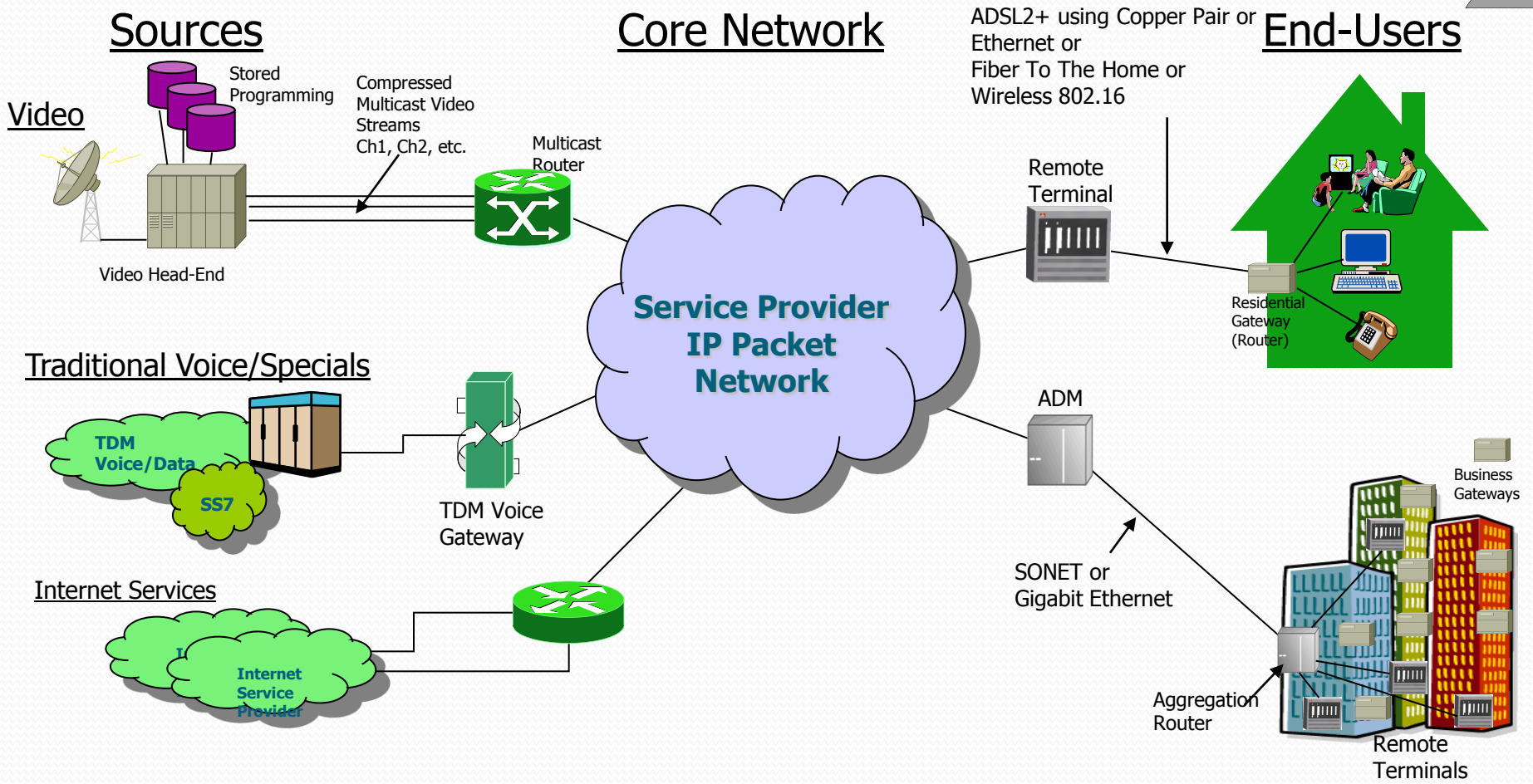
- Loss of personal privacy and protection of confidential data
- Risk misuse of personal information
- Insecure payment methods; recovering fraudulent charges if credit card information falls into criminal hands
- Transaction confirmation and cancellation policies, for example, consumer's lack of knowledge on cancellation rights for online transactions, including for mistakenly made purchases
- Fraud and deception, for example, lack means to authenticate merchandise purchased online.
- Unsafe products – see before I buy
- Other concerns including computer fraud, hacking, virus, interception and alteration of financial data, and misuse of personal information

The New End-User Network



- Residential Gateway and Remote Terminal devices are Layer 3 IP
- Interconnection on premises is inexpensive Ethernet at Layer 2
- VoIP SW / Call Server can be internal to the Remote Terminal

Pulling it All Together



- Manage one network providing multiple services (line qualification, pre-provisioning,
- Use an IP infrastructure with Traffic Engineering and QoS
- Leverage our Network savvy and experience

Universal Service Fund

- FCC calls the current USF a “High Cost Fund”
 - Value was \$2.3B in 1998
 - Value is \$9B in 2010
 - Approximately a \$7/month tax
- FCC wants reform: current USF is “complex”, “mind boggling”, “antiquated”, “abused”, “waste”, “fraud”
- FCC attempting to reform to “High Value Fund” based on broadband



The Challenge of USF Reform

- Look at where we have come so far!
 - 90% of households served today
 - Last 10% (7 million households/24 million users) are the challenge
 - Private investment in BB is estimated in the \$50-60B range
 - “Light Touch” policy to date (Title 1)
- While most agree reform is needed, no consensus on approach exists
 - Creating doubt and anxiety for investors
 - FCC wants to freeze fund size while raising the service level
 - FCC power is in question – should Congress intervene?
 - Lengthy litigation is guaranteed no matter what happens



USF Reform Battlefields



- Timeframe
- Details needed for agreement
- Reclassification – who gets what
- Inter-carrier Compensation
- Carrier of Last Resort
- Does FCC have the “power” to enact such change?
- Definitions and Responsibilities shrouded in history
 - Telecom Acts of 1934 and 1996 outdated
 - FCC Chairman Powell re-defined cable modem ISP service as Title I “information” carriers rather than Title II “telecommunications” services
 - Title II of the Communications Act, declares it unlawful for common carriers “to make any unjust or unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services for or in connection with like communication service.”
 - Brand X (Chevron) Decision by Supreme Court
 - Comcast Decision by Court that FCC had no jurisdiction over Bit Torrent control (Title I)

Who are we? What do we do?

- We are the “phone company”
- We sell telephone service

- Do we sell video?
- Do we sell computers?
- Do we sell switches and routers?
- Do we sell Internet?



Who are we becoming?

- We are the source for bandwidth.
- We can help fix your network.
- We can help fix your PC.
- We are the Internet Experts.
- We 'are' the Internet!
- Oh, and we have voice services too.
- And maybe even TV as well!

BANDWIDTH



HOW MUCH IS NEEDED, AND HOW MUCH IS IT WORTH?



Beresford Municipal Telephone Company



A view of the Beresford Municipal Telephone and Cablevision building located in downtown Beresford.

Beresford Municipal Telephone Company: Responsible for the administration of telephone, cable television and internet services.

Department Head: Todd Hansen

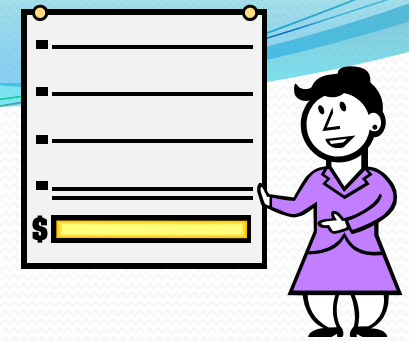
101 N Third Street

To register for service or ask questions:

Phone: (605) 763-2500

Email: phone@bmtc.net

The Bottom Line

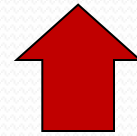
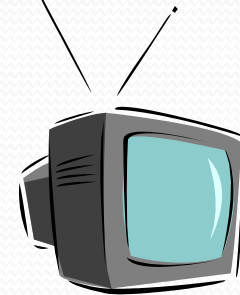
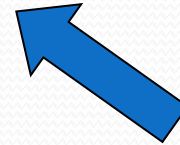
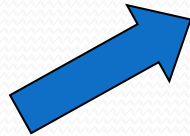


- We are leaders in the technology of the Internet
- We want to teach our customers
 - How to use it
 - How it benefits them
 - How to partner with us
- Does technology open new markets? Yes!
- Will we experience more productivity and become more efficient? Yes!
- Does technology create opportunity? Yes!

Broadband – an enabler!

Emerging Applications

- Combined features make dial-features look like dinosaurs!
- Market is still developing rapidly in this space
- With or without wireless – just Physical interface choice!



- Integrated web + phone
- Integrated email
- Anywhere connectivity
- Integrated Application (timecard, database)
- Enhanced Dial (tones, call waiting, caller id, caller location, follow-me ringing)
- Video, TV

- Integrated phone/caller info
- Integrated web surfing
- Video conferencing
- Enhanced on-demand services
- Integrated two-way Application/Advertising
- Enhanced Gaming

Our Services

- For copies of this presentation – please send me an email andyw@cellstream.com
- Visit our web site for:
 - What you need to do to prepare your team
 - IP Skills
 - Broadband Selling
 - Network Planning/Design
 - Vendor service analysis (RFI/RFQ/RFP)
 - Much more...

WWW.CELLSTREAM.COM

The screenshot shows the CellStream, Inc. website. At the top, it displays the time '11:45:58PM Jun. 25, 2010' and the company name 'CellStream, Inc.' with a search bar. Below the header are navigation tabs: 'Consulting Services', 'Learning', 'News and Events', 'Other Places', and 'Contact Us'. The main content area is divided into several sections: 'CONSULTING' (describing consulting strengths in network design and management), 'OUR CLIENTS' (listing primary clients like network and computing equipment manufacturers), 'LEARNING' (describing enhanced learning services and technical training), 'OUR CONSULTANTS' (highlighting consultants with cumulative experience), 'DETOUR' (a link to learn more), and 'HISTORY LESSON' (a link to internet and telecommunication history). Below these is a section for 'See Mr. Walding in Interviews!' with photos of several men. The footer contains logos for various associations: TSTA (Texas Statewide Telecommunications Association), WSTA (Wisconsin State Telecommunications Association), CTA (Colorado Telecommunications Association), OIA (Ohio Telecommunications Association), and OPASTCO (Virginia Telecommunications Association).

Questions....

