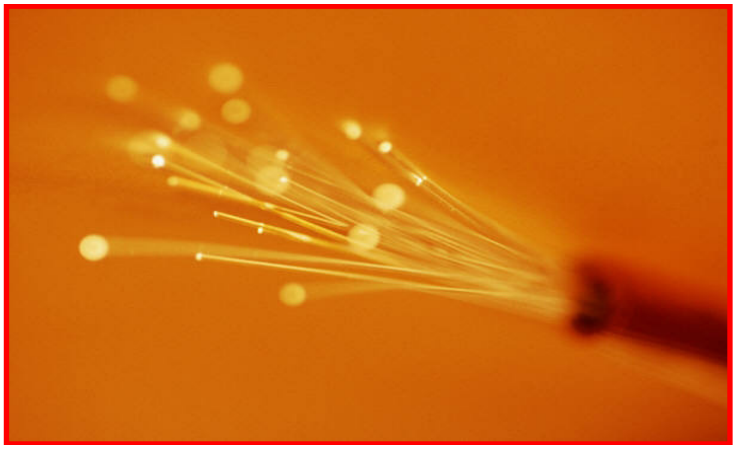
Fairfax and Cable: From Television Sets to Communications Policy



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I. Introduction

A. With the new technologies introduced in recent years, choosing a video provider – and even simply buying a TV set – is more complex than it used to be.

B. This course provides some basic information on consumers' options in choosing a a cable operator and on buying a TV. The details (especially prices) are subject to change, given the fast pace of development in communications technology.

C. The session will finish with a brief look at the road ahead in communications policy.

II. Connecting Your Home

A. **Ways to Connect**. Today's home is connected to the world via many channels of communication: in historical order, voice, video, and data.

1. This presentation focuses on video, but notes how different video options affect voice and data as well.
2. Sources for video programming include:
   a. Over-the-air ("OTA") broadcast television
   b. Cable television
   c. Satellite ("direct broadcast satellite," or "DBS")
   d. Recorded video on DVD, Blu-ray, tape
   e. "Over-the-top" ("OTT") video via the Internet, including wireless options

B. **Cable Companies and Systems**

1. Three cable operators serve Fairfax County:
   a. Cox Communications Northern Virginia (except in Reston)
   b. Comcast (Reston only)
   c. Verizon (entire County)
2. These cable operators differ in their network architecture – the basic design of the systems that deliver the content.
   a. Traditional cable: "hybrid fiber-coax" ("HFC"). Optical fiber runs from the cable system "headend" to a neighborhood node, typically serving 50-200 homes. Coaxial copper cable carries the signal from the node to the individual home. Amplifiers are used in the coaxial runs to boost the signal. Cox and Comcast both operate HFC systems.
   b. Fiber-to-the-home ("FTTH"). Verizon's FiOS system brings fiber right up to an optical network terminal ("ONT") on the side of the house. Copper wiring is used only inside the home. Amplifiers

are not needed because optical signals over fiber can travel much farther without attenuation than electrical signals over copper.

c. Both types of systems can offer fairly comparable levels of service at present, but FTTH has much greater potential for increased capacity in the long run.

d. Generally, fiber makes for better signal quality, easier maintenance, and greater reliability, as well as higher capacity.

C. **Other options**

1. Traditional telepone
2. Over-the-air video (terrestrial) ("OTA")
3. Wireless (cell phones and other mobile devices)
4. Satellite
5. "Over-the-Top" video via the Internet

D. **Cable Services and Pricing**

1. Cable providers bundle video channels in tiers or packages. *Basic* service is the lowest tier, which includes over-the-air broadcast channels - among others. Each company uses different brand names to refer to its packages. Tiers above the basic tier are sometimes referred to generically as "expanded basic."
2. *Premium* channels such as HBO and Showtime are sold on a per-channel basis. (Today such a "channel" may actually represent a cluster of subchannels, such as the HBO variants.)
3. *Pay-per-view* (PPV) or *video-on-demand* (VOD) is sold on a per-program basis.
4. A given channel or package may be available on some systems in either analog or digital format.
5. Similarly, a given channel or package may be available in either standard-definition (SD) or high-definition (HD) format.
6. Equipment from the cable company is generally necessary to view TV programs, depending on the particular setup. Most often, a subscriber will "rent" a set-top box ("STB") and remote control from the cable company for each TV, at a price of about $7 per month.
7. To watch a given type of programming, one needs the appropriate type of STB. For example, to see digital channels, a digital (not analog) box is usually needed. To see HD video, an HD-capable box is needed.
8. Some operators may insert additional charges, such as an "HD technology fee," to enable certain types of programming. These are essentially part of the service price, broken out to make the service price look lower.
9. A recent trend is to add such separate line items to highlight certain kinds of programming costs, such as regional sports networks or broadcast "retransmission consent" fees. Such line items may not be tied at all closely to the cable operator's actual costs.
10. To record TV programs for later viewings, one uses a digital video recorder ("DVR"). Typically, the DVR is built into the set-top box; DVR-equipped STBs cost more, around $17 per month. One can also use a

third-party DVR such as a TiVo and rent a CableCARD ($5 per month) from the cable company.

11. Some subscribers choose to pay for an "equipment protection" or "wire protection" plan – a type of "insurance" or service contract from the cable company that covers problems with the wiring in the subscriber's home.

E. **Factors in Choosing a Cable Provider**

1. Services: In large part**,** the same channels and programming can be found on each system, but there may be some specific differences.
2. Price: The "list price" for each company's services may be similar. However, providers may offer different sorts of bundles or promotional deals. Be sure the cable company representative has included all the applicable extra fees or line items in stating the total cost.
3. Power issues: Traditional telephone systems, which ran over copper "twisted pair" wires, could power some home telephones from the central office if the home were affected by a power outage. However, electric power does not travel over fiber. Both Verizon's FiOS, and the voice-over-IP ("VoIP") telephone solutions offered by Cox and Comcast, require battery power in the home to maintain telephone service in a power outage.
4. Because VoIP telephone service is linked to an IP address rather than a physical location, an emergency call to 9-1-1 may not always convey the location data normally provided by traditional phone service ("enhanced 9-1-1" or "E911" service). The caller may need to report the physical address manually.

F. **Reducing Cable Costs**. The cable industry has always been characterized by constantly rising costs. There are no magic solutions to this problem. Fairfax County is prohibited by federal law from regulating cable rates. However, there are some options available to a subscriber who is seeking to reduce costs.

1. Change to a lower service level with fewer channels.
   a. Note that packages are frequently offered at low introductory rates; then after six months, one or two years, or some other time period, the rates increase to "normal" levels. The providers do not always provide notice when introductory or promotional rates are ending.
2. Eliminate some or all of the premium services for movies and sports.
3. If the Internet service is at a higher-than-basic speed level, decide whether the higher speed is actually necessary. Be aware of any usage caps, although these are unusual in wireline packages (they are more common in wireless plans).
4. Change bundle options. Investigate the cost of dividing your bundled services among several providers (see II.F.8 below re substitute services).
5. Evaluate the costs and benefits of any "wire service maintenance" or "protection plan."
6. Check to see whether a better deal is available from another provider, if there is a choice of providers and the subscriber is not under a long-term contract.

7. Negotiate: tell the current cable company that another provider is offering lower rates for new subscribers**;** ask whether current provider can do as well or better. This approach can be applied to specific discount suggestions: for example, ask the cable operator to provide the DVR for no cost or at a lower rate for the next 6-12 months.
8. Substitute services
   a. Video:
      (1) Rent movies from services such as Redbox ($1.20-1.50 per day) or Netflix instead of paying for premium movie channels.
      (2) Use the Internet to "stream" TV programs from services such as Netflix or Hulu, instead of subscribing to some or all cable channels. See "over-the-top" video, III.K above, for options.
      (3) Use an indoor or outdoor antenna to get free over-the-air programming from local TV broadcast stations – especially for secondary or for seldom-used TVs.
   b. Voice:
      (1) Internet services such as Skype, Vonage, Magic Jack can provide VoIP voice service (as well as videoconferencing).
      (2) It may be possible to eliminate wireline phone service and use cell phones instead.
      (3) A home security system can be served by a wireless connection for an additional $5 a month (over the $20 base price), eliminating the requirement for a phone line.
   c. Data: Wireless options are much talked about for Internet connections, but they are frequently limited in speed and subject to monthly data caps.

III. Tips for Buying a New TV

A. **The analog-to-digital transition**. Broadcast television since 2009, like much cable and satellite television, is digital in format.

B. **New TVs are digital**
   1. Digital TVs have clearer picture and sound than analog.
   2. A new digital TV does not need the digital-to-analog converter box that may have been necessary with an older analog TV to get free over-the-air channels using an antenna.

C. **Size**
   1. Digital TVs have flat screens and are relatively light. Smaller sets generally weigh 8-20 pounds; mid-size sets, 25-30 pounds. A larger set (over 40" diagonal) may require two people to set up.
   2. If you generally sit only 3-4 feet from your TV, your set should have at least a 29" screen; this will typically cost $150 to $240 and likely will run at only 720p and 60 Hz (see III.D and III.E below). If you sit 4-5+ feet away, a set with a 32" screen is much better; at 720p, and only 60 Hz, it will cost $230 to $259. A 32" set with 1080p and only 60 Hz will cost $300; with 120 Hz it will cost $350. If you sit 5-6+ feet away, a larger set

with a 37" to 39" screen and 1080p, but only 60 Hz, will cost $370; with 120 Hz it will only cost another $20-$50.

3. Sitting 7-8+ feet away, larger sets are better. 42" sets rated 1080p and 60 Hz can be found for as low as $470-$490; with 120 Hz they are $490-$510. A 46"-47" set with 1080p and 60 Hz will run $500-$550; with 120 Hz it will cost $570-$700. At 9-10+ feet away, consider a larger set: 52", 55", 57", 60", 65" or more. Sales in some stores may allow you to buy a high-quality name-brand 55" set with 1080p and 120Hz for $750-$800. A 60" set will cost $900 and up.

D. **Resolution: 720p vs. 1080p**

1. The digital TV picture's display format is defined by the resolution in pixels (picture elements), and by the abbreviation "p" (progressive) or "i" (interlaced). Progressive is better than interlaced; higher resolution is better than lower. (Analog TVs have a resolution of only 480i.)
2. If the TV's packaging states it is "high definition" but does not give a specific format number, it is probably only 720p.
3. If the TV is used to play "Blu-ray" discs, 1080p is especially important: a 720p TV set will not display the high resolution on Blu-ray discs.
4. On smaller sets (up to about 32"), 720p may be sufficient. These sets are currently $50 to $150 less expensive.

E. **Refresh rate: 60 Hz vs. 120 Hz**

1. The rate at which the screen cycles or "refreshes," measured in Hertz (Hz), affects how motion is displayed. On smaller sets, up to about 32", 60 Hz may be adequate. Fast-moving objects, as in sports, can appear somewhat "jerky" on larger sets with only a 60 Hz refresh rate. Motion is smoother at 120 Hz.
2. Very high-end sets have moved to a 240 Hz refresh rate or more, but usually the difference between 240 HZ and 120 Hz is not readily discernible to the human eye.
3. Some manufacturers have begun using terms other than the refresh rate described above, such as "Clear Motion Rate." This is not the same as the essential Hz refresh rate.

F. **Screen type**

1. LCD and LED-LCD: Digital sets have either plain LCD screens (no LED technology) or the improved LED-Edgelit and LED-Backlit technologies. Budget permitting, purchase an LED set. On sets larger than 32", however, it is more important first to get 1080p and 120 Hz.
2. Plasma: For rooms with windows facing the TV, select an LED set because sunlight, glare, or reflections will interfere with plasma displays (most have shiny glass-like screens). The same is true of lamps at night.

   For a relatively dark room, plasma is preferable. In the latter case, check on the cost of an anti-glare coating.

G. **3D**

1. 3D prices have dropped substantially. 3D technology also continues to evolve. For example, watching 3D screens requires special glasses. But newer "passive" 3D glasses (which utilize small watch batteries and have

no cords) are replacing "active" glasses (requiring cords from the glasses to the TV). 3D sets generally include at least two pairs of these glasses.

2. Top-quality 3D sets are in the $1,000-$2,000 price range, although they can go to $3,000 or more, depending on size and other features.
3. Not much 3D programming is currently available over cable, although this may change over time. Currently, satellite service provides more 3D programs). 3D Blu-ray players, of course, allow the use of 3D discs.
4. Newer 3D sets have moved to 240 HZ, rather than 120 Hz, providing greater clarity and depth of field.

H. **Sound and Speakers**

1. One disadvantageous change in recent years is the disappearance of forward-facing speakers in the sides or the bottom portion of the TV. Most TVs now have speakers facing out the back side. As a result, the speakers project the sound "backwards" to the wall behind the TV, whence it bounces forward toward the viewer. This can result in a slightly muffled effect, especially for special sound effects or music, and especially if there are curtains, drapes, blinds, or other surfaces that are not hard and flat directly behind the TV.
2. The least expensive approach to improve the sound is to connect external sound systems or speakers you already own, using audio connectors built into the back of the typical digital TV.
3. A second option is to purchase a "sound bar" (about 24"-30" long and 4-6" high), which is placed just below and in front of the screen. The simplest sound bars cost $90 to $100. Better versions also include a "sub-woofer" for much improved sound **-** including bass; these cost $160-$200.
4. Finally, there are excellent home-theatre and surround-sound systems that run $250 (very basic) to $600 or significantly more. These products may require a professional to install and balance properly.

I. **Standard vs. High Definition**

1. A new digital set will be capable of receiving both "standard" or "SD" (480p) and "high-definition" or "HD" (720p and 1080p) TV signals.
2. Subscribers to cable systems may watch the lowest-level (SD) programming, or they may subscribe for a higher price to HD programming that takes full advantage of the HD features of the new digital television. The same programs are often telecast in both SD and HD formats.

J. **Connections**

1. There are various ways to connect a new TV to a cable box, DVD player, or other device. The best way currently is via "HDMI" cable. A new TV should have at least one HDMI connection (double-check for this in the store), and preferably two or three.
2. HDMI cables are available for purchase in stores or over the Internet. A six-foot cable may cost $7-10. Some stores may offer a special high-quality HDMI cable for $40-80; experts agree, however, that this is unnecessary.

3. On larger sets, consider having your existing equipment hooked up as part of the delivery.

K. **Over-the-Top**. A new TV can use what is commonly called an "over-the-top" ("OTT") device to access video via an Internet connection. Some Internet video services, such as YouTube, are free. Others, such as NetFlix, Amazon Instant Video, and Hulu, require low monthly subscription fees.

1. This connection is made either via Wi-Fi, or by or hard-wiring the device to the Internet router in your home.
2. Over-the-top devices like a Blu-ray player, Wii console, Roku box, Xbox 360, or PlayStation 3 cost about $70-$150. Google's Chromecast costs about $35.
3. Most OTT devices do not have a Web browser. The user cannot "surf" the Web or send emails. The device is limited to streaming video and using other special applications.

L. **Smart TVs**

1. Televisions have now begun to integrate the functions found in computers, phones, and special "apps" (software applications on devices such as tablets and smartphones). Be sure to explore carefully exactly what features are included, and which are not, on the various "smart TV" models.
2. A smart TV does more than the typical over-the-top box mentioned above (III.K). It has Internet-access functionality built right into the TV, so you do not need a separate over-the-top device. But some smart TVs have a browser, others have only limited capabilities, and some are only "Internet ready" and require the purchase of additional equipment.
3. If you buy a smart TV, determine if there is a remote keyboard available to purchase.

M. **Things to Come**

1. Already available: digital TVs with either a separate or built-in Webcam. Such a camera can enable a user to carry on a video conversation with distant family or friends over the Internet.
2. Voice control and "gesture control" (using hand movements, as in a Wii game) may become available to manage various TV functions, supplementing the use of buttons on a remote control.
3. Higher-than-HD resolutions: for example, "4K" ultra-high resolution (Ultra HD or U-HDTV), at four times the current high-def "1080p" level.
4. Extra-thin, flexible OLED (organic light-emitting diode) displays.

N. **Final tips**

1. Use a surge protector rated at a minimum of 3,200 to 4,000 joules to protect the TV and other devices hooked to it from electric power faults. A good surge protector may cost $30-40.
2. Determine the store's policy on returns, and what store and manufacturer warranties are included. Keep the original sales receipt and a copy of the original manufacturer's warranty. Keep the original packaging for at least a few weeks in case it is necessary to return the TV set.

3. Some credit card companies will actually double the length of the manufacturer's warranty at no additional cost when a purchase is made on that card. Call the customer service number on the back of the credit card, in advance, to see if this applies and if there are any special conditions.

IV. Coming Issues in Communications

A. Transition of the Public Switched Telephone Network (PSTN)
   1. Two major changes are under way – one in hardware, one in software. They are frequently confused, but may occur separately.
   2. Telcos seek to change over traditional circuit-switched telephone service using time-division multiplexing (TDM) to packet-switched service using IP.
   3. Telcos are changing out traditional "twisted-pair" copper wires for fiber-optics – or in some cases for wireless.
   4. The change from copper to fiber frequently meets resistance because it eliminates the traditional security of phone lines that continue working in a power outage, because they are powered from the central office (wire center) down the copper wire.
   5. A change to wireless saves money for the provider, but may deprive the user of functionality.

B. Network neutrality (open Internet access)
   1. Public access to the Internet initially developed using dial-up telephone lines under conditions of Title II common carriage.
   2. This resulted in a "flat" distribution model that drastically reduced entry costs for business, accelerating competition by edge providers.
   3. The FCC declined to apply common-carrier standards to broadband Internet access.
   4. This change potentially allows Internet service providers (ISPs) – today, telcos and cable companies – to control content distribution and to extract "tolls" or taxes not only for Internet connectivity, but for businesses to reach their subscribers.
   5. Similar related issues occur elsewhere in the network, as in peering arrangements.
   6. The FCC's attempts to apply nondiscrimination rules without common carriage were rejected twice by the federal Court of Appeals for the D.C. Circuit (Comcast/BitTorrent, 2010; *Verizon v. FCC*, 2014).
   7. FCC apparently intends to attempt enforcement under Section 706 without common carriage.

C. Over-the-top video vs. the traditional cable business model
   1. Streaming video via the Internet can compete with packaged cable distribution of multichannel video.
   2. Speed limitations, pricing, data caps, and outright interference by the ISP can prevent such competition.
   3. This issue thus ties in with net neutrality.

D. Privacy and security

1. Privacy, and security of personal information (financial and otherwise), is a long-running issue. For example, 47 U.S.C. § 551 in the Cable Act deals with subscriber privacy.
2. As more and more is done online, these issues grow in importance.
3. ISPs are in a uniquely powerful position to collect personal information.
4. The issue was exacerbated when government agencies were found to be working closely with telcos to collect personal information.
5. No global solution is in sight.

V. Conclusion

A. **Constant Development**. The technology, the market, and the legal landscape are constantly changing. A savvy consumer needs to keep up to date.

B. **Assistance from Fairfax County**

1. Cable companies operate under franchises from the County, and are subject to federal, state, and County laws.
2. The County assists residents in resolving:
   a. Cable-related problems and issues, including construction matters
   b. Consumer complaints
   c. Cable questions about service, policy, and regulations
3. For general consumer protection issues, such as billing disputes, contact the Consumer Affairs Branch at *consumer@fairfaxcounty.gov* to file a complaint, or call 703-222-8435 to speak with an investigator.
4. For cable-specific issues and regulatory or policy questions, contact the Communications Policy and Regulation Division at *cprd@fairfaxcounty.gov* or call 703-324-5902. Many questions may also be answered online at *www.fairfaxcounty.gov/cable*.