Watching TV over the Internet and trends in TV viewing

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LLI/NOVA (Zoom Class)
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Introduction

Topics today:

- Some Technology Trends
 - Current TV Technology 4K TVs, 8K TVs, OLEDS, QLEDS, HDR, HZ (refresh rates)
- Watching TV (Video) over the Internet
 - Where we find Internet TV Content Netflix/Hulu/Amazon etc.
 - Streaming Media Players, Gaming Consoles
 - Demonstration of watching Internet TV with a Smart TV (if technically feasible)
- Other Ways to Get TV (Video)
 - Getting local broadcast TV using a TV antenna over the air (OTA)
 - Demonstration of OTA TV (if technically feasible)
- Privacy/Safety in watching TV over the Internet
 - Will my Smart TV or streaming device snoop on me?
 - Ways to reduce snooping e.g., opting into provided privacy choices, using private VPNs.

TV's - Types

Do you still have an old standard definition TV?



CRT (Cathode Ray Tube TV) Standard definition TV. Can still work with a Cable TV box.

IV's Picture Display Types

o LED



LED TVs use light-emitting diodes (LEDs) to backlight an Liquid Crystal Display (LCD) display. LED backlight flows through a series of filters and polarizing layers

o QLED



QLED (Samsung) = LED TV + Quantum Dots (semiconductor nanocrystals which can produce pure monochromatic red, green, and blue light).

OLED



OLED (LG) (Organic light-emitting diode) uses an organic substance that glows when an electric current is introduced. OLED technology energizes and lights up each individual pixel independently and can go to complete blackness. Introducing LG Evo OLED in 2021.

Mini-LED



Mini-LED (TCL) Much improved contrast. In 2021 Samsung introducing Neo QLED and and LG QNED. MicroLED (not mini-LED) is also being introduced by Samsung in 2021

CRTs,Plasmas,LCDs

GONE!

5

Features - Picture Quality / Resolution

Type	Dimensions (Horizontal x Vertical Lines)	Total Pixels	Clarity/ Resolution
SDTV	640 x 480 pixels	0.30 million	1
HDTV 720p	1280 x 720 pixels	0.922 million	2.8X
Full HD 1080p	1920 x 1080 pixels	2.074 million	6.3X (1)
UHD or 4K	3840 x 2160 pixels	8.3 million	25X (4)
8K	7680 x 4380 pixels	33 million	110X (<mark>16</mark>)

*Please note. All Prices quoted in presentation are approximate and are used as an example only and may not be current

Latest TVs

Prices Are Down for 4K TVs (prices as of 10/21/2020)

Similar when checked in June 2020.







LG - 50" Class UN7000 Series LED 4K UHD Smart webOS TV \$ 319.99. HDR (60HZ)

TCL - 50" Class 5 Series LED 4K UHD Smart Roku TV Model:50S535 \$399 (120Hz?) HDR

Samsung - 50" Class 7 Series LED 4K UHD Smart Tizen TV \$349.99 (60Hz) HDR

Most TVs of any size now have the ability to be controlled by voice or be controlled by house smart devices such as using Amazon Alexa, Google Assistant, Apple HomeKit, Bixby, SmartThings

OLED and QLED TVs





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LG - 65" Class GX Series OLED 4K UHD Smart webOS TV Model:OLED65GXPUA \$2,599 (Black Friday price).

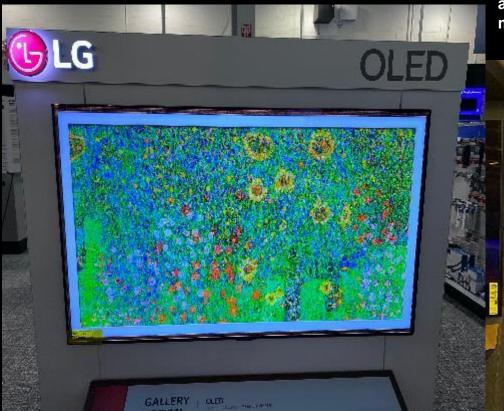
TCL - 65" Class 6 Series LED 4K UHD Smart Roku TV Model:65R625 \$729 Samsung - 65" Class Q60T Series LED 4K UHD Smart Tizen TV Model:QN65Q60TAFXZA \$949

Most TVs of any size now have the ability to be controlled by voice or be controlled by house smart devices such as using Amazon Alexa, Google Assistant, Apple HomeKit, Bixby, SmartThings

Other New Interesting TVs







LG OLED – Gallery Design TV (Thin as a picture) 65" \$2,599

Samsung - 43" Class "The Sero" Series LED 4K UHD Smart Tizen TV. \$1,499 https://www.bestbuy.com/site/samsung-43-class-the-sero-series-led-4k-uhd-smart-tizen-tv/6405709.p?skuld=6405709

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Samsung - 75" Class The Frame Series QLED 4K UHD Smart Tizen TV Model:QN75LS03TAFXZA HDR from \$799 to \$2,199 *Please note. All Prices quoted in presentation are approximate and are used as an example only and may not be current

8K TVs

Latest TVs





Samsung - 55" Class - LED - Q900 Series - 4320p - Smart - 8K UHD TV with HDR \$2,499.99 Model:QN55Q900RBFXZA

Sony - 85" Class - LED - Z9G MASTER Series - 4320p - Smart - 8K UHD TV with HD. \$7,999.99 Model:XBR85Z9G



LG - 77" Class - ZX Series - 8K UHD TV - Smart - OLED - with HDR Model:OLED77ZXPUA \$19,999.99

Features - HDR

HDR greatly increases the range of color, brightness and contrast on a TV to produce a more realistic image.







Features - HDR

High Dynamic Range (HDR)

- HDR greatly increases the range of color, brightness and contrast on a TV to produce a more realistic image.
- Brightness: A normal TV puts out around 100 300 "nits" of brightness. An HDR TV can in theory produce up to 5,000 nits.

Note: Generally TVs that claim to be HDR or "HDR compatible" may be able to only play HDR content, but not have full HDR picture quality.

Features – Refresh Rate

Comparing refresh rates:



Screen Size

How Large a Screen Do You Need?

An old 32-inch 4:3 screen is Is the equivalent to a digital 43 inch 16:9 screen



Seated Distance From TV	2.5-5.5 Feet	3.0 - 6.5 Feet	3.5 – 6.5 Feet	4.0 – 8.5 Feet
Recommended Size of 4K TV Screen	40''	50''	55"	65'' +

Features - Sound

LG - 2.1-Channel 300W Soundbar

Sound systems can vastly improve the quality of your viewing experience - latest are WiFi based systems





Example Top Sound System

(unknown make)

\$60,000 -\$120,000?







Pictures courtesy of Best Buy







Onkyo 5+1 Surround **Sound Channel** \$369

"OVER THE TOP" - INTERNET VIDEO

Why TV Over the Internet?

Most people have received video over cable in the past 30 years

Sources of dissatisfaction with cable:

- Rates
- Customer service
- Packaging of Programs

Therefore other sources for video are developing, including "over-the-top" (OTT) (video over the Internet)

Internet Video or Over-the-Top Video (OTT)

OTT is streaming video to your TV over the Internet. (movies, TV shows, clips, etc.)

OTT is often referred to as "over-the-top" because these services ride on top of the service you already get – <u>except you do need Internet</u> <u>service</u> for it to work (usually from your cable provider)

Can choose one channel e.g. Netflix or a package (similar to a cable tier) e.g, Slingbox TV to get programming or a "Buffet of Packages"

Internet Video From The Cable Company

Comcast, Cox, Verizon operate in Fairfax County

Cox Contour (in home) and Cox "tve" TV Everywhere (home) and TV Online

Cox: https://www.cox.com/residential/tv/tv-apps.html?sc_id=cr_dm_camp_z_tveverywhere_vanity

Verizon's "Watch FiOS Now"

Verizon: <u>www.verizon.com/tvonline</u>

Comcast's "TVGo" allow streaming of channels online and on demand

Comcast: http://tvgo.xfinity.com/watch-live-tv

Ways to Get TV Over the Internet (OTT Video)

Package Providers	Cost per month/Yr	Best for	Original Content
Netflix	\$8.99/mo Standard Definition \$14/mo for	Vast library of movies and TV shows	House of Cards, Orange is the New Black,
	4K UHD		"Stranger"
Acorn TV	\$5.99/mo or \$5/yr.	Lovers of British TV Fare.	Classic 80's comedies "Alfresco"
Amazon Prime TV	Free with Prime membership costing	Anyone who's already paying Amazon prime	"Z": The Beginning of Everything' and "Grand
	\$12.99/mo or \$119/yr. Prime video is	membership.	Tour", Exclusive "Downton Abbey"
	\$8.99 extra		
CBS All Access	\$5.99/mo	Major network fare. Access to all CBS	
		programming plus some live.	
Direc TV Now	25/mo (60 channels) – with cloud DVR	Anyone who wanted DirecTV without a satellite	Some local live TV in 75% of the country.
		Dish.	
Drama Fever	\$4.99/mo or \$4.19/mo (annual contract)	Korean, Taiwanese dramas (w/Eng subtitles)	
Fubo TV Premier	\$64.99/mo (80 channels) also some live	Sport fans. Also live TV. Free cloud DVR	
	TV.		
HBO Now	\$14.99/mo	Movies, series and documentaries.	
Hulu or Hulu Live	\$5.99/mo w/ads and \$12/mo without ads	Movies, series and documentaries	CBS, ABC, Fox, and NBX. "The Path" The
	(with live TV \$40 per month)		Mermaids Tale"
Philo	\$16 per month \$4 for add on channel (37	Non sports.	
	channels)		
Playstation Vue	\$44.99 (90 channels)	Cable style TV package	
Showtime	\$10.99/mo	Cable network without cable.	"Homeland", "the Affair"
Sling TV	Orange costs \$30 per month		
Xfinity (Comcast)	Free to cable subscribers	TV on the go.	
Starz	\$8.99 per month		"Outlander" and "Power"
You Tube TV	\$64.99 per month, cloud DVR (up to 3	Some live TV - Cable style package	
	users) Local channels		

Devices That Get You TV over the Internet

Streaming Media Devices (Boxes & Sticks):

Roku, Apple TV, TiVo, Amazon Fire, Google Chromecast, etc.









Blu-Ray Players & Game Boxes:

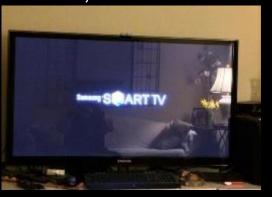
Samsung, Sony, LG, PS4, Xbox, Nintendo, etc.





Smart TVs:

Built in Roku TV, Amazon Fire TV, etc.





Laptops, Tablets, Cell Phones



SMART TVS to Get Internet TV Programming



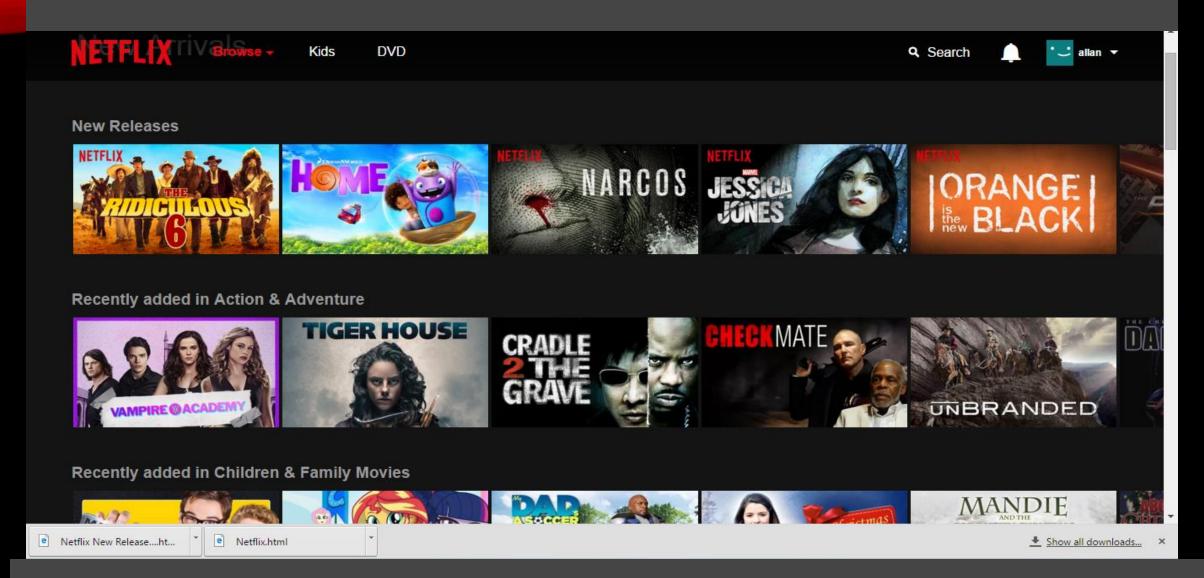
SMART TV - ICONS



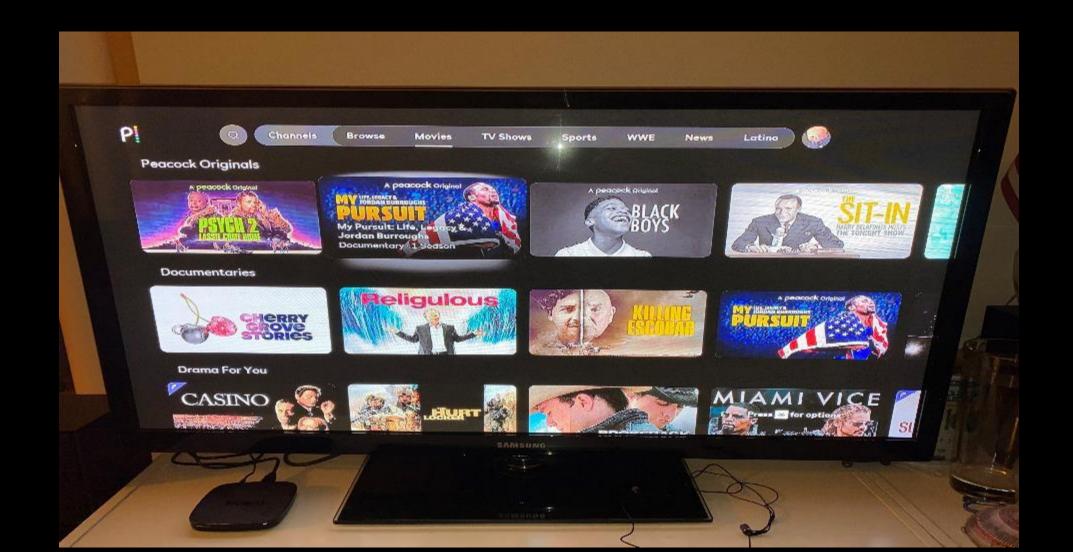
SMART TV WITH ROKU BOX ADDED



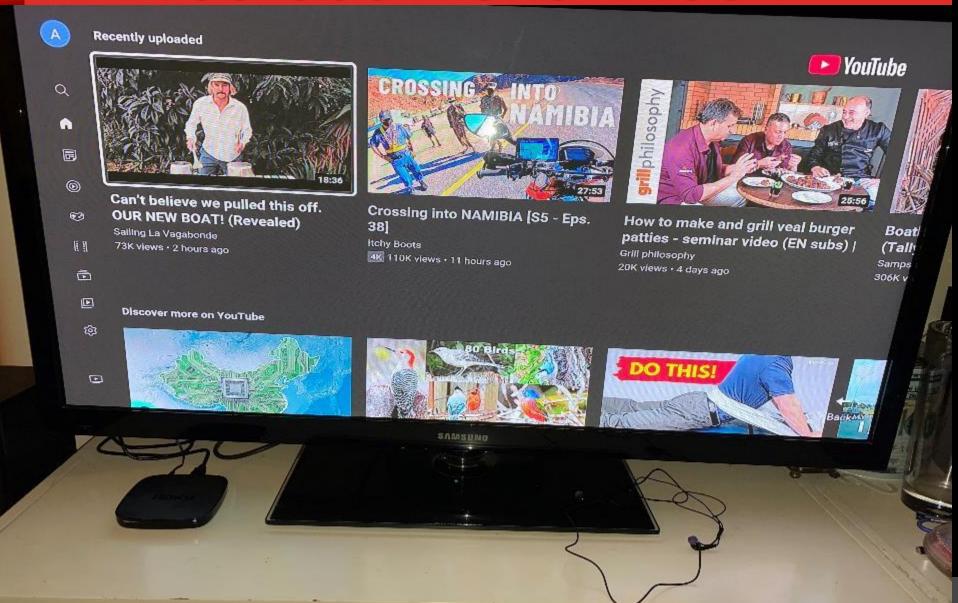
Netflix Menu



Peacock Menu – Free TV



YouTube Menu – free TV



Hulu Menu



ROKU Smart TVs to get Internet Programming



ROKU has also placed its streaming media player facilities directly into TV sets (similar to a smart TV) instead of having to hook up a ROKU device separately. TV Manufacturers of the "ROKU TV" include - Haier, Hisense, Insignia, Sharp.

Generally cheaper than main brand smart TVs. Supports 4K content, easy to use to get Internet content. Some Roku devices support HDR content.

Pros and Cons of Video over the Internet

Free offerings: YouTube, ad-supported sites

Subscription offerings: e.g., Netflix, SlingTV, CBS All Access

Real Time or "live" programming currently limited but getting better

Requires high-speed Internet service

On demand selection of programming and ability to pause or fast forward very useful

Costs add up if subscribe to several channels

Privacy/Safety in watching TV over the Internet using a SMart TV

Will my Smart TV or streaming device snoop on me?

Yes. Just in the same way as when you go onto the Internet using a computer or mobile device you will be snooped on. Every device connected to the Internet works to capture as much info about you as it can (your personal data and activities).

In a smart TV (Samsung) this could be:

a. Interest based advertising. (Samsung Smart TV aims to show you relevant ads based on the level of interest your household show in products) It will use your TV's unique advertising ID and Internet protocol ID address to provide to third parties.

b. Viewing Information services (what sort of programs you watch) e.g., The networks, channels, websites visited, and programs viewed, and the amount of time spent viewing them

c. Voice recognition services (if you have a microphone e.g. Google Voice or Alexa it will record and analyze what you say)

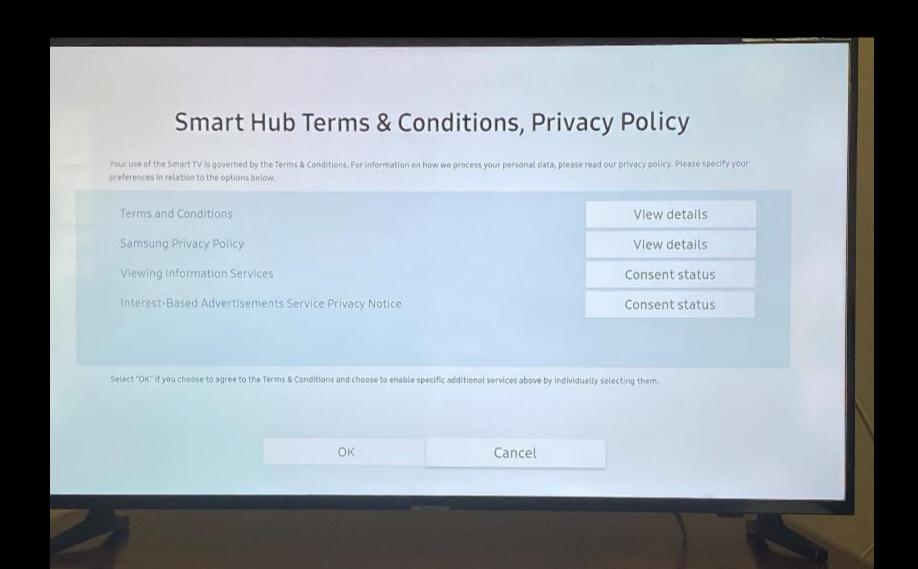
Trifecta of things industry wants to know:

- a. IP address (every smart TV or device has a unique IP address. Wants to link your info about you to IP address.
- b. Location. Can determine your location from Wi-fi access points.
- c. Device fingerprinting information (device IDs etc. use of browsers by a device).

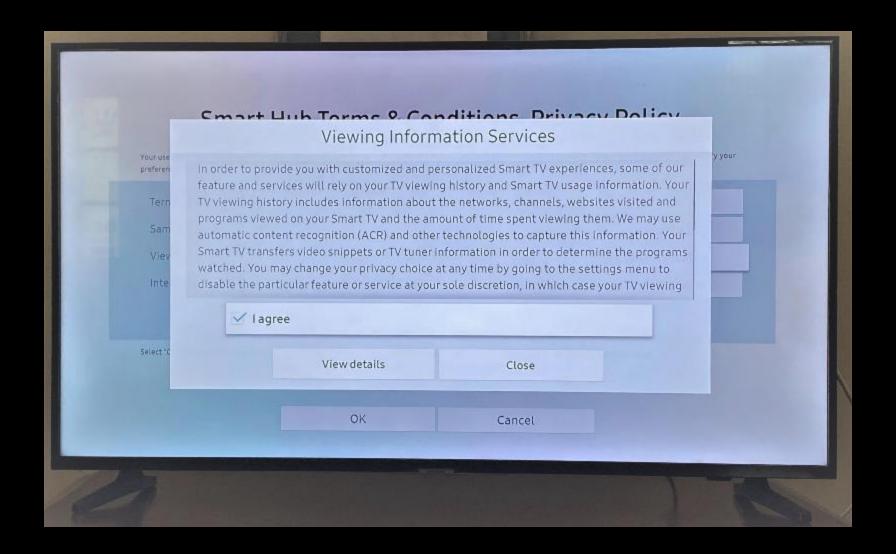
• What can I do to lessen snooping: Will a VPN (Virtual Private Network) help?

- Can use a private VPN system e.g., NordVPN or ExpressVPN etc.) which will make your IP address invisible.
- Can opt into choices offered by Samsung, or Google or Apple that offer VPN like options remembering that no matter what you do (unless you use a private VPN) either Google or Apple will ultimately possess ALL your data.

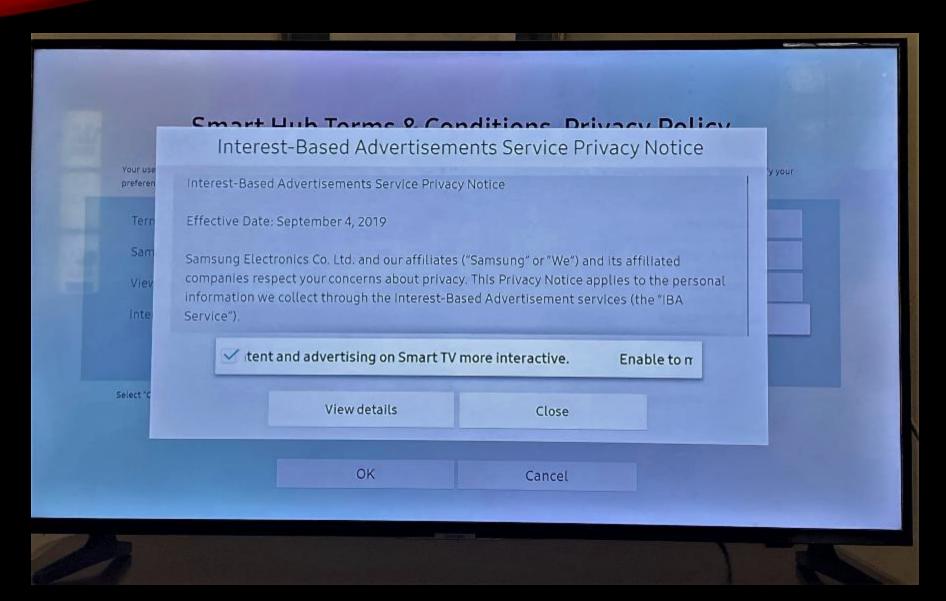
Privacy/Safety in watching TV over the Internet. Samsung Smart TV (go to menu/privacy policy/terms)



Privacy/Safety in watching TV over the Internet. Samsung Smart TV (go to menu and find privacy policy) You can opt out!

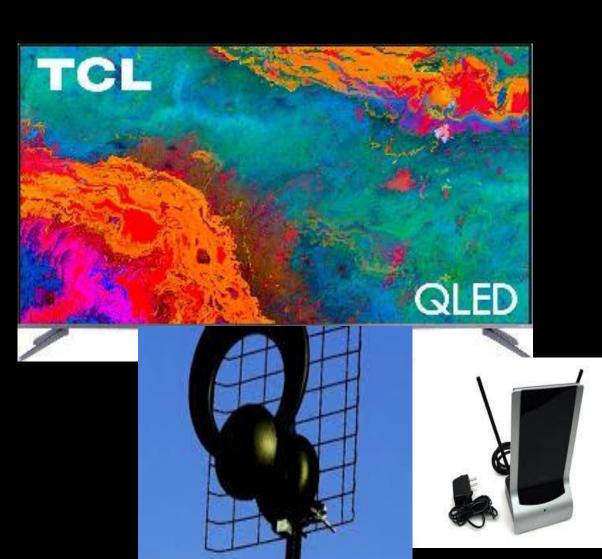


Privacy/Safety in watching TV over the Internet. Samsung Smart TV (go to menu and find privacy policy) You can opt out!



Getting TV OTA then and now





Over the Air TV

June 12, 2009: FCC-mandated switch from analog to digital signals for <u>local broadcast stations such as WETA,NBC, ABC, UNIVISION</u>

With new digital technology, broadcast TV pictures appear crisp, not "snowy

Channel 7 – WJLA, ABC

Can receive High Definition (HD) TV or Standard definition channels. For example:

7.1 HD

7.2 SD Me-TV

7.3 SD WJLA CMT

TV Set Needed (to get OTA)

- Digital TV
 - ■To receive HD signals, need an HDTV (720p or 1080p or 4K)
- Analog TV (older type of TV)
 - Requires digital-to-analog converter box
 - Old TV's (electronics) can be disposed of free of charge 7 days a week (all opening hours) at the County Landfill sites (West Ox Road or Lorton)

NOTE - Rooftop antennas/masts MUST BE GROUNDED!!

FOR OTA TV Antenna Needed The higher the better









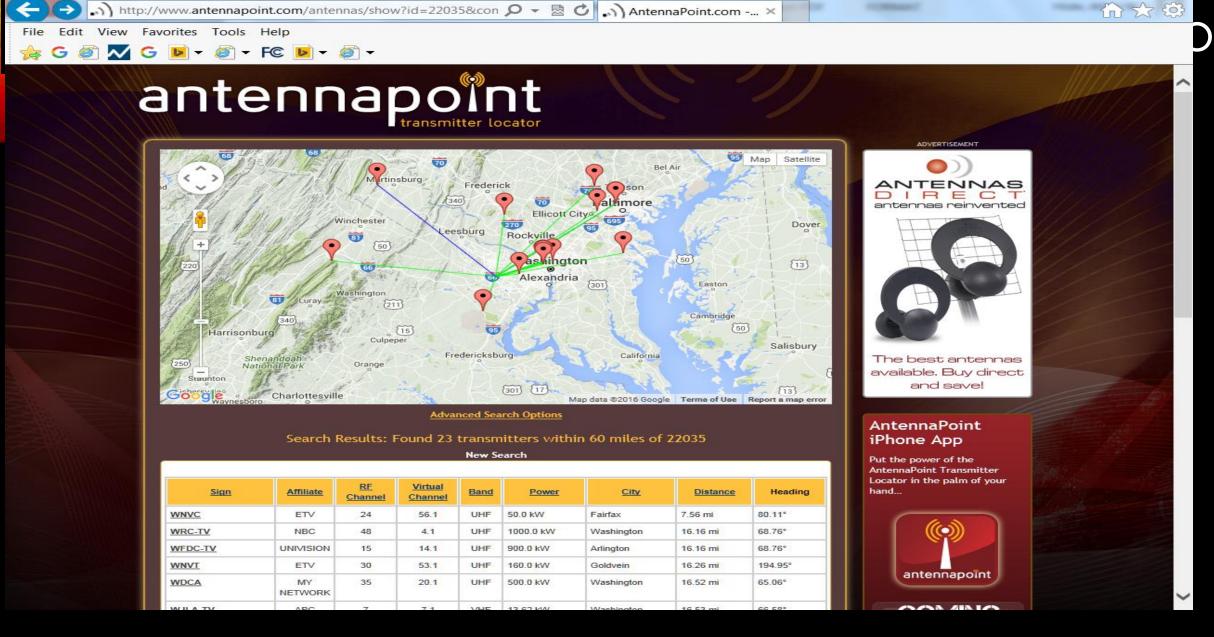












TVFool.com, Antennaweb.org, AntennaPoint.com

Emergency Broadband Benefit Plan (EBB)

It is a \$3.2 billion federal initiative to help lower the cost of high-speed internet for eligible households during the on-going COVID-19 pandemic. The Emergency Broadband Benefit Program was created by Congress in the Consolidated Appropriations Act of 2021.

Starting on May 12th, eligible persons can enroll in the FCC's Emergency Broadband Benefit (EBB) program. The program is temporary and it has been designed to help families and households that are struggling to afford home or wireless internet service during the COVID-19 pandemic. Persons/households that are eligible for the program will receive a discount of up to \$50 per month towards broadband service from a participating provider and up to \$75 a month for households on qualifying tribal lands. Households can also receive up to a \$100 discount on the purchase of a laptop, desktop, computer, or tablet from a participating provider if they contribute more than \$10 and less than \$50 towards the purchase price. There is a limit of one monthly service discount and one device discount allowed per household.

EBB Program Eligibility Requirements

- In order to qualify for the program, an individual in a household must meet one of the following criteria:
- Has an income that is at or below 135% of the <u>Federal Poverty Guidelines</u> (typically earns less than \$14,820) or participates in certain assistance programs, such as SNAP, Medicaid, or <u>Lifeline</u>
- Approved to receive benefits under the free and reduced-price school lunch program or the school breakfast program, including through the USDA Community Eligibility Provision in the 2019-2020 or 2020-2021 school year;
- Received a Federal Pell Grant during the current award year;
- Experienced a substantial loss of income due to job loss or furlough since February 29, 2020, and the household had a total income in 2020 at or below \$99,000 for single filers and \$198,000 for joint filers; or
- Meets the eligibility criteria for a participating provider's existing low-income or COVID-19 program.

Emergency Broadband Benefit Plan (EBB)

- The EBB is designed to help households in need obtain a discount on monthly Internet access and on a computer or tablet. You can click here to see the latest EBB program updates from the FCC and here for the FCC's consumer FAQ.
- How to Apply. Beginning on May 12, 2021, eligible households can apply in three ways:
- 1. Contact your preferred participating broadband provider directly to learn about their application process. Here is the list of other participating broadband providers in Virginia.
- 2. Go to GetEmergencyBroadband.org to apply online and to find participating providers near you.
- 3. Call 833-511-0311 for a mail-in application, and return it along with proof of eligibility to: Emergency Broadband Support Center P.O. Box 7081 London, KY 40742
- Eligibility. A household is eligible for the EBB if one member of the household:
- Qualifies for the <u>Lifeline program</u> or is on Medicaid or receives SNAP benefits;
- Receives benefits under the free and reduced-price <u>school lunch program or the school breakfast program</u> (including through the <u>USDA Community</u> Eligibility Provision);
- Received a Federal Pell Grant in the current award year;
- Experienced a substantial loss of income (job loss or furlough) since February 29, 2020 and the household had a total income in 2020 below \$99,000 for single income tax filers and \$198,000 for joint filers; or
- Meets the eligibility criteria for a participating providers' existing low-income or COVID-19 program. (In Fairfax County, the existing Cable TV providers' low-cost programs can be found here for Comcast, Cox and Verizon.)
- Benefits. Eligible households can receive discounts of up to \$50 a month for broadband service and a one-time discount of up to \$100 on a computer or tablet. The EBB is limited to one monthly service discount and one device discount per eligible household. These benefits will end once the program funds are exhausted, or six months after the Department of Health and Human Services declares an end to the pandemic, whichever comes first.
- Background. The FCC sought public comments and, on February 25, 2021, unanimously voted to adopt a Report and Order implementing the program. See the FCC's Fact Sheet here.

Cox Low-Cost Internet Programs

Cox internet COVID-19 assistance (throughout County except for Reston)

Low-income customers: Read about Connect2Compete or call 855-222-3252.

- Cox Communications will temporarily double the download speeds to 50Mbps from 25Mbps for its Connect2Compete service through the end of the 2020-21 school year. This increase will be effective Friday, Dec. 11, 2020 through June 30, 2021.
- Program includes \$9.95 per month internet service for qualifying households.
- Through June 30, 2021, Cox is suspending late fees and extending payment relief offerings for customers in the Connect2Compete that express an inability to pay due to pandemic hardships.
- Details of additional support offerings can be found <u>here</u>.
- For Connect2Compete application, ID is required by Cox. Forms of ID that can be given in lieu of a Social Security number:
- Group 1-Picture ID
 - State issued driver's license
 - Valid (non-expired) passport
 - State issued ID card
 - Military ID
- Group 2-Non-Picture ID
 - Current lease agreement in the account holder's name and address
 - Social Security card
 - Current original utility bill in the account holder's name and address
- Regular Cox customer assistance during COVID-19 pandemic:
- Internet Starter 10 (\$29.99) for new customers offer expires March 31, 2022?
- Fairfax County does not guarantee information displayed reflects the cable providers' latest rates or offerings. Offers shown may expire or may be subject to change as matters develop

Verizon low-cost provider programs

Verizon internet COVID-19 assistance (throughout the County):

Low-income customers:

New and also existing low-income Fios customers who qualify through Lifeline can enroll in Verizon's "fios-forward" internet service, which offers internet speeds of 200/200 Mbps starting at \$19.99 per month plus tax, with total savings of up to \$20 per month. Customers must first apply to Lifeline (a Federal program) to qualify for these discounted service costs from Verizon. Click on the Lifeline discount and service details links below to apply to Lifeline or see the attached PDF documents regarding Lifeline and Lifeline application forms.

FCC Lifeline PDF Forms:

- <u>Lifeline Service Details</u> English
- <u>Lifeline Service Application</u> English
- Lifeline Service Details Spanish
- <u>Lifeline Service Application</u> Spanish
- Verizon Lifeline program information and application or dial 1-800-837-4966.
- Starting July 1, 2020, Verizon customers who previously signed up during Verizon's pledge to keep them connected (which expired on June 30, 2020) may be automatically enrolled in Verizon's Stay Connected repayment program to provide repayment options to stay connected.
- The Federal Communications Commission also extends through June 30, 2021, its waiver of the Lifeline program's requirement that consumers seeking to demonstrate income-based qualification for the Lifeline program must provide at least three consecutive months of documentation to confirm their income.

Comcast low-cost provider programs

Comcast COVID-19 Programs and Low Cost Progams

- Comcast (Xfinity) internet COVID-19 assistance (Reston only): Comcast has extended through June 2021, 60 days of free internet service to new eligible Internet Essentials customers. In addition, Comcast will continue to waive, through June 30, 2021, the requirement that customers not have a past due balance with Comcast to qualify for the free offer.
- Low-income customers: Internet Essentials information, or dial 1-855-846-8376 English, 1-855-765-6995 Spanish. Program includes \$9.95 per month internet service for qualifying households. May offer free internet service for 60 days to new Internet Essentials customers. Effective Mar 1, 2021, Comcast is doubling the program's internet download speed to 50 Mbps and increasing the upstream speed to 5 Mbps for all new and existing customers at no additional cost
- Regular Comcast customer assistance during COVID–19 pandemic: This <u>assistance</u> may include waivers for an inability to pay by the due date, for Comcast subscribers, and free Comcast Wi-Fi spots available to all Reston franchise area residents (including non-Xfinity internet subscribers.)

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Questions

Communications Policy and Regulation Division (assists with cable-related problems and cable safety and construction issues)

Allan Hide

- Call: 703-324-5902 or 324-4980 or 571-459-8974
- email: <u>allan.hide@fairfaxcounty.gov</u> <u>douglas.Povich@fairfaxcounty.gov</u>
- Web: www.FairfaxCounty.gov/cable/
- Consumer Affairs Branch (incl. cable billing and all complaints against a business in the County)
 - Call for advice: 703-222-8435
 - File complaints: www.FairfaxCounty.gov/ consumer/complaints.htm

Lower Your Cable Bill

County has no authority to regulate rates. FCC also chooses not to and FCC declared "Effective Competition" in Fairfax County in 2007.

Try to get promotional pricing (offers) from competitor (not regular published rates), get promo prices in hand to negotiate best deal

Approach customer retention rep. or loyalty rep., not regular customer service rep. Switch provider if option!

AND /OR

Think about the channels you absolutely must have

Consider Switching source of channels: OTT, OTA

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- Consumer Affairs Branch (incl. cable billing and all complaints against a business in the County)
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