

# Watching TV over the Internet and Trends in TV Viewing

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# Introduction

## Topics today:

- **Some Technology Trends**
  - Current TV Technology – 4K TVs, OLEDs vs QLEDs, HDR, HZ (refresh rate)
- **Watching TV (Video) over the Internet**
  - Where we find Internet TV Content – Netflix/Hulu/Amazon etc.
  - Streaming Media Players, Gaming Consoles
  - Demonstration of OTT 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)

# TV's Picture Quality - Types

## What types of TV display are currently available?

### ○ LED



LED TVs are a type of LED/LCD TV that uses light-emitting diodes (LEDs) to backlight the display instead of fluorescent lights (CCFLs - used in the older LCD TVs) LED backlight flows through a series of filters and polarizing layers.

### ○ 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.

~~○ Plasmas, LCDs~~

Plasmas, LCDs - Largely gone

# Latest TVs

## Prices Are Down for 4K TVs (prices as of 1/22/2019)

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



**LG LED 49.6" (50") \$299\***  
UK6090PUA Series - 2160p -  
Smart - 4K UHD TV with HDR  
(60Hz) (HDR compatible).



**VIZIO – (49.5") 50" Class \$ 299\***  
LED - 2160p - Smart - 4K UHD  
TV (60Hz) (HDR compatible)  
Model:V505-G9



**Samsung - (49.5") 50" \$379\***  
Class - LED - NU6900 Series -  
2160p - Smart - 4K UHD TV  
(120Hz) (HDR compatible)



# Latest TVs

## Flagship TVs - OLEDs, QLEDs

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



**OLED LG 65"**  
HDR, Smart 4K UHD about (65"  
\$2,699\*, 55" \$1,699\*)



**OLED SONY BRAVIA**  
65" HDR, Smart 4K UHD  
(65" \$2,999\*, 55" \$2,299\*)



**QLED Q9 Samsung**  
65" HDR, Smart 4K UHD  
(65" \$2,299\*, 55" \$1,499\*)

# Features - Picture Quality / Resolution

Type	Dimensions (Horizontal x Vertical Lines)	Total Pixels	Acuity/ 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 (16)



# Features - HDR

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

STANDARD CONTRAST



HIGH DYNAMIC RANGE



Pictures courtesy of Best Buy



## 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  
25.6" wide and **19.2"** tall.

Need a digital **43 inch** 16:9 screen  
(36.6 " wide and **20.6"** tall) to get  
equivalent height.



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

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



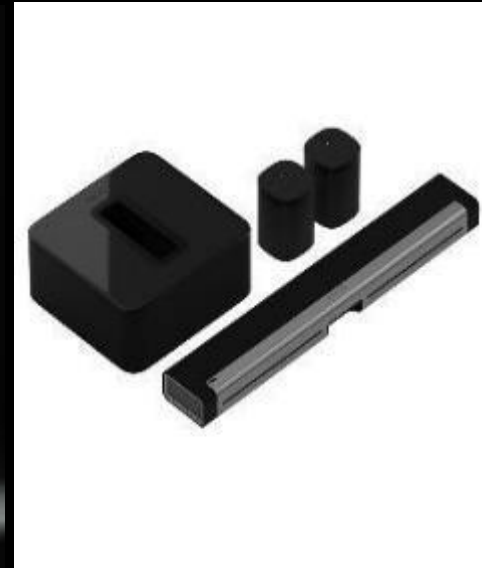
LG - 2.1-Channel 300W Soundbar w/Wireless Subwoofer – Black \$129



Example Top Sound System  
(unknown make)  
\$60,000 - \$120,000?



Wilson Audio  
Sabrina  
\$15,900



Sonos  
WiFi  
\$1,299



Onkyo  
5+1 Surround  
Sound Channel  
\$369

Pictures courtesy of Best Buy



# TV OVER THE INTERNET

## 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 – **except you do need Internet service 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](https://www.cox.com/residential/tv/tv-apps.html?sc_id=cr_dm_camp_z_tveverywhere_vanity)

**Verizon’s “Watch FiOS Now”**

Verizon: [www.verizon.com/tvonline](http://www.verizon.com/tvonline)

**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
<b>Netflix</b>	\$8/mo Standard Definition \$14/mo for 4K UHD	Vast library of movies and TV shows	House of Cards, Orange is the New Black, "Stranger"
<b>Acorn TV</b>	\$5/mo or \$5/yr.	Lovers of British TV Fare.	Classic 80's comedies "Alfresco"
<b>Amazon Prime TV</b>	\$11/mo or \$99/yr. (can add HB), Showtime for \$9 - \$15/mo.	Anyone who's already paying Amazon prime membership.	"Z": The Beginning of Everything' and "Grand Tour", Exclusive "Downton Abbey"
<b>CBS All Access</b>	\$6/mo	Major network fare. Access to all CBS programming plus some live.	
<b>Direc TV Now</b>	\$35/mo (60 channels) – Will add a cloud DVR this spring.	Anyone who wanted DirecTV without a satellite Dish.	Some local live TV in 75% of the country.
<b>Drama Fever</b>	\$4.99/mo or \$4.19/mo (annual contract)	Korean, Taiwanese dramas (w/Eng subtitles)	
<b>Fubo TV Premier</b>	\$45/mo (80 channels) also some live TV.	Sport fans. Also live TV. Free cloud DVR	
<b>HBO Now</b>	\$15/mo	Movies, series and documentaries.	
<b>Hulu or Hulu Live</b>	\$8/mo w/ads and \$12/mo without (with live TV \$40 per month)	Movies, series and documentaries	CBS, ABC, Fox, and NBX. "The Path" The Mermaids Tale"
<b>Philo</b>	\$16 per month \$4 for add on channel (37 channels)	Non sports.	
<b>Playstation Vue</b>	\$40 (90 channels) to \$75/mo (includes premium channels)	Cable style TV package	
<b>Showtime</b>	\$11/mo	Cable network without cable.	"Homeland", "the Affair"
<b>Sling TV</b>	Orange costs \$20 per month		
<b>Xfinity (Comcast)</b>	Free to cable subscribers	TV on the go.	
<b>Starz</b>	\$9 per month		"Outlander" and "Power"
<b>You Tube TV</b>	\$40 per month, cloud DVR (up to 3 users)	Some live TV - Cable style package	

# 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







Search 

SMART HUB



Netflix



M-GO



Amazo...



Hulu Plus



Milk Music



Samsung Apps 




Movies&TV Shows



Fitness



Kids



Social TV




Channel



Web Browser



Schedule Mana...



Source



Samsung Link



AOL On



Explore 3D



Samsung Cares



YouTube



AccuWeather

 allanhide@gmail.com

 Logout

 Wallpaper

 Account Manager

 Tools

 Return

SAMSUNG

1111



# Netflix Menu

NETFLIX Arrivals Browse ▾

Kids

DVD

Search



allan ▾

## New Releases



## Recently added in Action & Adventure



## Recently added in Children & Family Movies



Netflix New Release....ht...

Netflix.html

Show all downloads...

# Hulu Menu

The screenshot displays the Hulu website interface. At the top, there is a navigation bar with links for TV, MOVIES, ORIGINALS, KIDS, LATINO, and ADD-ONS. A search bar is located in the center of the top bar. On the right side of the top bar, there are links for WATCH COMMERCIAL FREE and ALLAN/ID.

The main banner features a promotional image for Michael Bublé's Christmas in Hollywood. The text on the banner reads: "Watch the Special Presentation Michael Bublé's Christmas in Hollywood. Join the multi-Grammy Award winner as he croons in the holiday season with special guests Celine Dion, Sharon Jones & the Dap-Kings, Tori Kelly, and more!" The banner is presented by Chex.

Below the banner, there is a section titled "ONLY ON HULU" with a right-pointing arrow. This section contains a grid of content cards for "the Mindy project", "Empire", "Seinfeld", "Casual", "Goldbergs", "INSIDE AMY SCHUMER", "ELEMENTARY", and "BROOKLYN SOUTH".

Below the "ONLY ON HULU" section is a section titled "THE MOST TV-FULL TIME OF THE YEAR" with a right-pointing arrow. This section contains a grid of content cards for "Tis the Season", "Empire", "ONCE", "modern family", "Casual", "BROOKLYN SOUTH", and "the Mindy project".

Below the "THE MOST TV-FULL TIME OF THE YEAR" section is a section titled "POPULAR SHOWS" with a right-pointing arrow. This section contains a grid of content cards for "SOUTH PARK", "modern family", "BROOKLYN SOUTH", "ARROW", "Seinfeld", and "NASHVILLE".

On the left side of the page, there is a sidebar for "The Mindy Project". It includes a star rating, the genre "Comedy", a description: "A single-camera comedy, starring Mindy Kaling, that follows a sicked-out M/FX navigating the tricky waters of both her personal and professional life, as she pursues her dreams of becoming the... more", a "Start Watching" button, a "Watch Now" button, and a "Add to Favorites" button.

At the bottom left of the page, there is a URL: <http://www.hulu.com/the-mindy-project>.



# YouTube Menu

The screenshot shows a web browser window with the address bar displaying `https://www.youtube.com/results?search_query=John+Wayne+Full+Movie`. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. Below the browser window is the YouTube interface. The search bar contains the text "John Wayne Full Movie" and shows "About 3,210,000 results".

The search results are listed as follows:

- The Space Between Us**  
Ad STX Entertainment  
132,871 views  
A Story of Love and Adventure In Theaters 2/3. Watch the Trailer!  
Video thumbnail: `OFFICIAL TRAILER 3` (1:19)
- "La La Land" Movie**  
Ad Lionsgate Movies  
16,116,545 views  
See The Movie Nominated For 14 Academy Awards - In Theaters Now!  
Video thumbnail: `LA LA LAND OFFICIAL TRAILER` (2:27)
- Big Jake John Wayne Full Movie HD**  
Western Guy  
1 year ago • 229,114 views  
JOHN WAYNE BIG JAKE FULL MOVIE SUBSCRIBE FOR MORE.  
Video thumbnail: `JOHN WAYNE BIG JAKE` (1:45:42)
- McLintock 1963 John Wayne, Maureen O'Hara - dir. Andrew V. McLaglen**  
classicmoviesmobile  
3 years ago • 1,093,035 views  
Director: Andrew V. McLaglen Writer: James Edward Grant (original screenplay) Casts: John Wayne, Maureen O'Hara, Patrick ...  
Video thumbnail: (2:06:48)
- Free western movies john wayne - Big Jake full movie - popular western movies full length**  
Bryce Peter  
1 year ago • 219,481 views  
Free western movies john wayne - Big Jake full movie - popular western movies full length.  
Video thumbnail: (1:35:23)
- Angel and the Badman | John Wayne, Gail Russell |**  
Video thumbnail: `WAYNE RUSSELL`



# 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.

# What an AppleTV Player May produce on a TV screen



# The Weakest Link

“The picture doesn’t look as good as in the store!” - remember  
“An army moves as slow as its slowest man”....

Similarity....

To play 4K (or HDR) **content** (from a 4K HDR Blue Ray disk for example) the **source device** must be a 4K or UHD or HDR capable Roku Player, or 4K UHD HDR Blue ray player etc.  
**the connections** (wires) 4 K capable HDMI 2 (not HDMI1) including HDMI 2 outlets on the TV and the **Television itself** should be 4K/HDR



# External Devices

When you buy a new 4K TV look for the latest HDMI connection outlets on the back of the TV called “HDCP2.2 Outlets” (High – bandwidth digital Content Protection) which will support 4K content from 4K devices being attached (like the Roku 4K streaming media player).



Latest HDMI outlets that support 4K



# 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; operation may be complicated

# Over the Air TV

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

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!!**

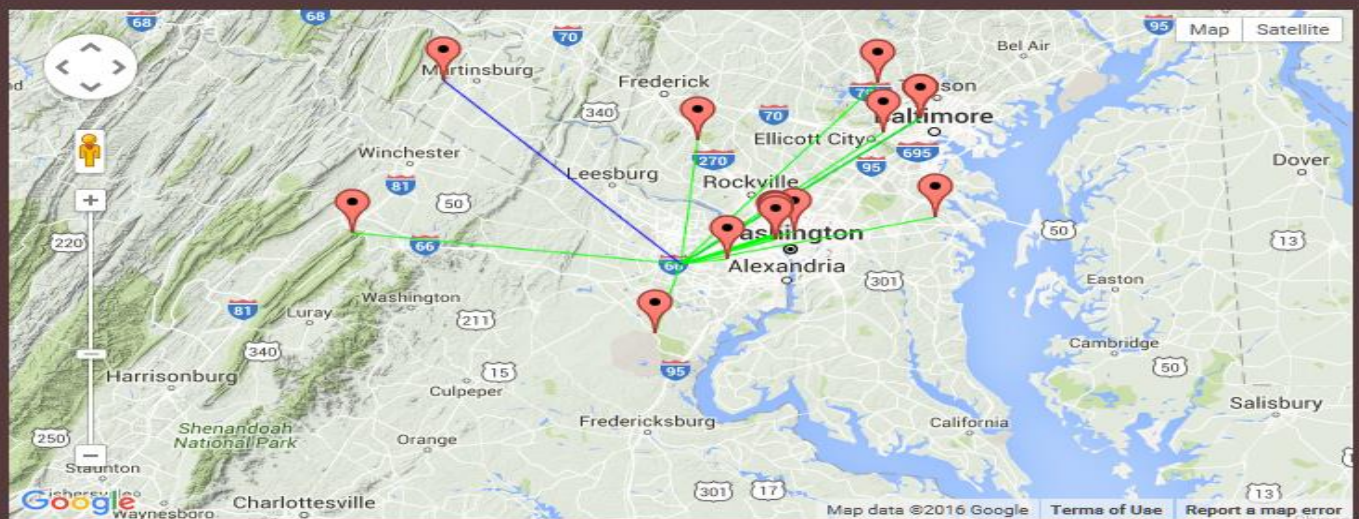
# FOR OTA TV Antenna Needed The higher the better





# antennapoint

transmitter locator



[Advanced Search Options](#)

Search Results: Found 23 transmitters within 60 miles of 22035

[New Search](#)

Sign	Affiliate	RF Channel	Virtual Channel	Band	Power	City	Distance	Heading
<a href="#">WNVC</a>	ETV	24	56.1	UHF	50.0 kW	Fairfax	7.56 mi	80.11°
<a href="#">WRC-TV</a>	NBC	48	4.1	UHF	1000.0 kW	Washington	16.16 mi	68.76°
<a href="#">WFDC-TV</a>	UNIVISION	15	14.1	UHF	900.0 kW	Arlington	16.16 mi	68.76°
<a href="#">WNVT</a>	ETV	30	53.1	UHF	160.0 kW	Goldvein	16.26 mi	194.95°
<a href="#">WDCA</a>	MY NETWORK	35	20.1	UHF	500.0 kW	Washington	16.52 mi	65.06°
<a href="#">WJLA-TV</a>	ABC	7	7.1	VHF	12.62 kW	Washington	16.53 mi	66.58°

ADVERTISEMENT

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The best antennas available. Buy direct and save!

**AntennaPoint iPhone App**

Put the power of the AntennaPoint Transmitter Locator in the palm of your hand...

# Need to scan for channels

- Go to Menu – Change input to “Over the air”
- Scan for available channels. Will only get local broadcast channels – NOT HBO, History Channel, or similar cable-only channels
- Rescan regularly, as channels are added frequently

# Choosing Services

## Cutting costs

Pare down services

Switch providers

Switch type of source: cable, OTA, OTT

Try to get **promotional pricing** (not regular published rates), especially when switching – get promo prices **in hand** to negotiate best deal

# 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
- email: [allan.hide@fairfaxcounty.gov](mailto:allan.hide@fairfaxcounty.gov)
- Web: [www.FairfaxCounty.gov/cable/](http://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](http://www.FairfaxCounty.gov/consumer/complaints.htm)



# Tips on Buying a New TV

## Improving the Wi-Fi Connection

Dual Band Wireless  
Gigabit Router  
Wi Fi with 2 access  
points

