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NETWORK



DENVER, CO
OCTOBER 17-20



Pay TV is Not Dead!

Myth Busting 101: It's (NOT) Inferior to OTT Cost and Value Experience

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Espial

Sections of this presentation

- What is the status of Pay TV services and what is the feedback from consumers?
- Cord shaver OTT users, what do they value and can they be converted back to Pay TV?
- What elements of the user experience do consumers use/value/need?
- What can the next generation Pay TV user experiences do to retain and grow subscribers?
- Summary

Conflicting views out there...

- Consumers moving away from Pay TV services towards self created OTT bundles
- Declines in Pay TV subscribers and increase in Cord Shaving
- Broadband the growth – video the decline
- Millennials not interested in Pay TV services and not going to watch TV in the future
- TV is the old way to consume video; mobile screens is the new way to consumer video
- Live TV is dead and people will watch most video time-shifted
- Set-top box (STB) being replaced by applications on other devices
- Does the MSO need its own STB?

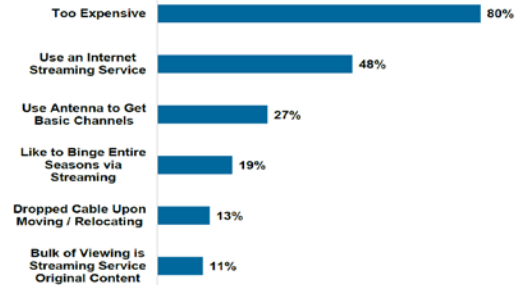
What we tend to see on weekly basis



MoffatNathanson showing 2-4% decline in Pay TV subs over last 7 years but is acceleration in its future

Video = Why Cord-Cutting? Lower Price + Convenience

Reasons for Cutting Pay-TV Service, Q4:16



KLEINER PERKINS

Source: TVivo Q4 2016 Video Trends Report
Note: Sample includes 181-year-olds in USA and Canada, n=3,079. Other categories omitted include: "Not My Choice," "Share SVOD Login," "Moved to With New Residence," "Other."

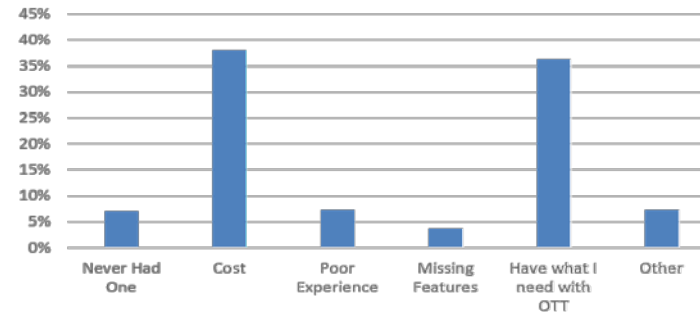
KP INTERNET TRENDS 2017 | PAGE 154

Mary Meeker of Kleiner Perkin's went one step further and showed 6 areas why consumers cord shave from Pay TV

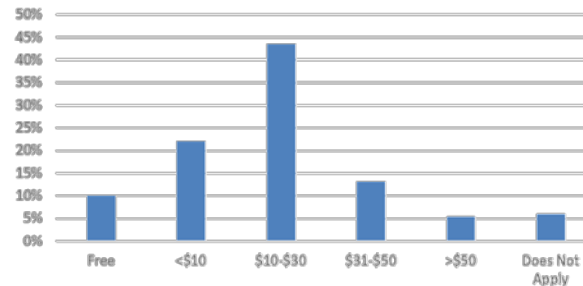
Why Cord Shavers don't have Pay TV and who they use

- Its cost and a belief they have what they need with OTT sources
- There is a group of home owners who want a more controlled environment for them and their kids and not spending hours watching TV
- Its really 2 to 4 sources they subscribe to.... Netflix and YouTube dominate and Amazon and Hulu round out the >2% sources
- And in reality they start to pay more – by adding services

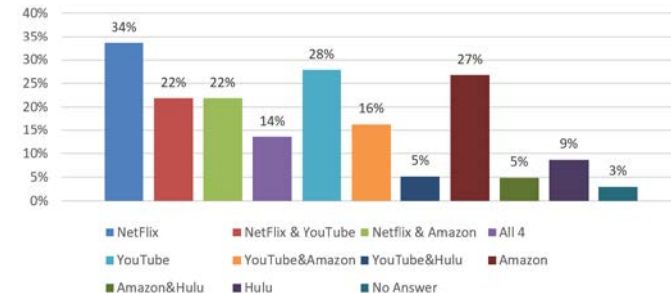
Why don't you have Pay TV



Price paid for sources by Cord Shavers (excludes BB costs)



What OTT Service do you have ?

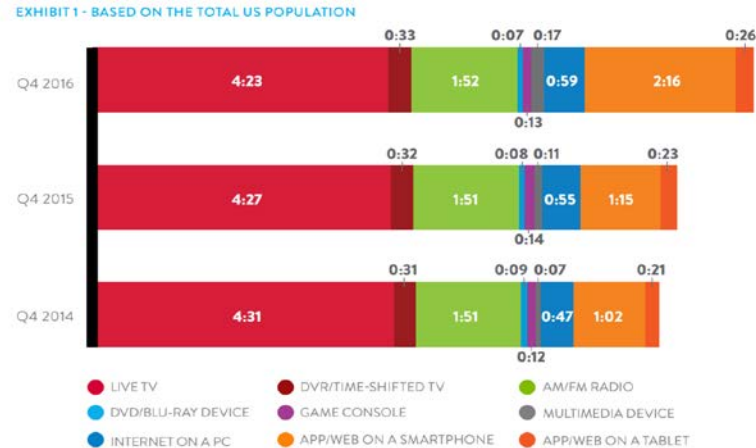


Is it more about just more consumption vs cannibalization?

Nielsen showing that there is general growth in viewing across all screens

Live TV has only dropped by 8 minutes per day over last 2 years

Largest increase on smart phone



[Source - 2016 Nielsen Total Audience Report](http://www.nielsen.com/us/en/insights/reports/2017/the-nielsen-total-audience-report-q4-2016.html)
<http://www.nielsen.com/us/en/insights/reports/2017/the-nielsen-total-audience-report-q4-2016.html>

Time Shifted content viewing has remained the same

Although binge viewing has risen?

There is also the background TV application which the US likes more than other regions. Multiple TVs left on – with background ambient noise/news etc.

We do have official surveys and correlation

FCC conducts 10 year survey each year for cable companies

2015 report published

Summary of typical Basic to Expanded to most popular beyond Enhanced shown here

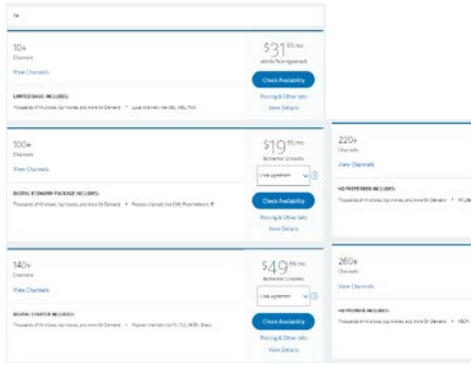
Comparison to Cost of Living Index – CPI. Price increase in cable is tracking higher than basic necessity products

Year	Basic Service Price	Expanded Basic Service			Next Most Popular Service and Equipment	CPI Index	
		Price	Channels	Price per Channel		All Items	Cable
2005	\$14.30	\$43.04	70.5	\$0.620	\$56.03	127.2	169.6
2006	\$14.59	\$45.26	71.0	\$0.650	\$59.09	132.2	174.4
2007	\$15.33	\$47.27	72.6	\$0.670	\$60.27	135.0	179.0
2008	\$16.11	\$49.65	72.8	\$0.680	\$63.66	140.8	183.9
2009	\$17.65	\$52.37	78.2	\$0.710	\$67.92	140.8	186.5
2010	\$17.93	\$54.44	117.0	\$0.560	\$71.39	144.5	191.9
2011	\$19.33	\$57.46	124.2	\$0.569	\$75.37	146.9	192.0
2012	\$20.55	\$61.63	149.9	\$0.505	\$78.91	151.2	199.8
2013	\$22.63	\$64.41	159.6	\$0.484	\$81.64	153.6	206.5
2014	\$22.78	\$66.61	167.3	\$0.496	\$84.65	156.0	212.0
2015	\$23.79	\$69.03	181.3	\$0.456	\$86.83	155.8	216.4
Compound Average Annual Rate of Change							
5-year average	5.8%	4.9%	9.2%	-4.0%	4.0%	1.5%	2.4%
10-year average	5.2%	4.8%	7.1%	-1.4%	4.5%	2.0%	2.5%

Source: 2005-2015 surveys. See Attachment 7 for references. Attachment 7 also shows the series back to 1995.

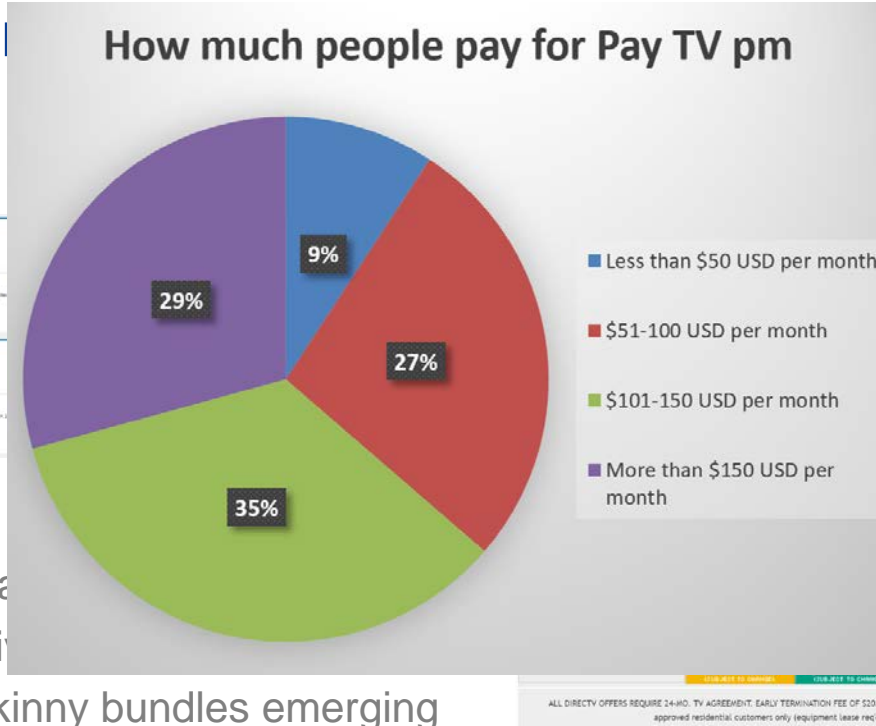
“2016 Statistical Report on Average Rates for Basic Service, Cable Programming Service, and Equipment”
https://apps.fcc.gov/edocs_public/attachmatch/DA-16-1166A1_Rcd.pdf

Some of the current



Comcast

- All pretty much the same
- Lots of 2 year incentives
- Some cord shaver skinny bundles emerging



Details	Prices
Enjoy the best in sports, news and family cable television from Charter Spectrum, 40 Mbps wireless Internet - The fastest and most reliable speeds available, Unlimited nationwide calling and 18+ popular phone features. A great deal for families!	From \$29.99/mo - each for 12 months when bundled*
All the great TV channels in our Select plan, plus premium media networks, 60 Mbps Internet - The fastest and most reliable network available from Charter Spectrum, Unlimited nationwide calling and 18+ popular features. Unparalleled customer service and the best package price!	SELECT + \$20 more per month
Enjoy the full Silver package plus our full guide of premium cable networks, 60 Mbps Internet - The fastest and most reliable service compared to other companies, Unlimited nationwide calling and 18+ popular features. An amazing bundle for first-time Charter customers!	SILVER + \$20 more per month for 12 mos*
Access 10,000+ On-Demand choices - including HD and movies in 3D, Stream live TV and On-Demand content with the Spectrum TV App. Access your favorite network TV apps. Optional DVR service can be added on up to 4 TVs in your home - up to 750 hours of storage. Speeds starting at 60 Mbps. FREE Online Protection with Security. Audio, FREE Access to all ESPN online content, FREE Internet modem. No data caps or extra fees. This Charter Spectrum promotion won't last forever!	from \$35.99/mo for 12 mos.* + \$29.99 fee for 12 mos.*
25+ channels including FREE HD, Access 10,000+ On-Demand choices - including HD and movies in 3D, Stream live TV and On-Demand content with the Spectrum TV App. Access your favorite network TV apps. Optional DVR service can be added on up to 4 TVs in your home - up to 750 hours of storage. This special deal is great for first-time customers!	from \$39.99/mo for 12 mos.*

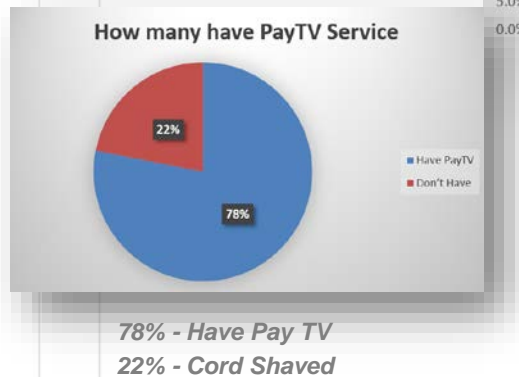
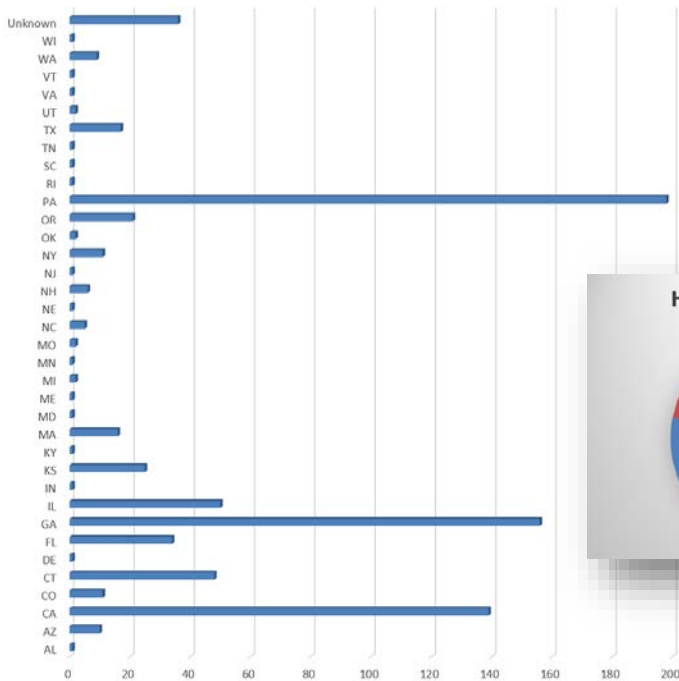
Charter/Spectrum package is right for you?

PACKAGE	Channels	Price
CRIBICE™	185+ Channels	\$60/mo
XTRA	230+ Channels	\$70/mo
ULTIMATE	245+ Channels	\$75/mo
PREMIER™	225+ Channels	\$125/mo

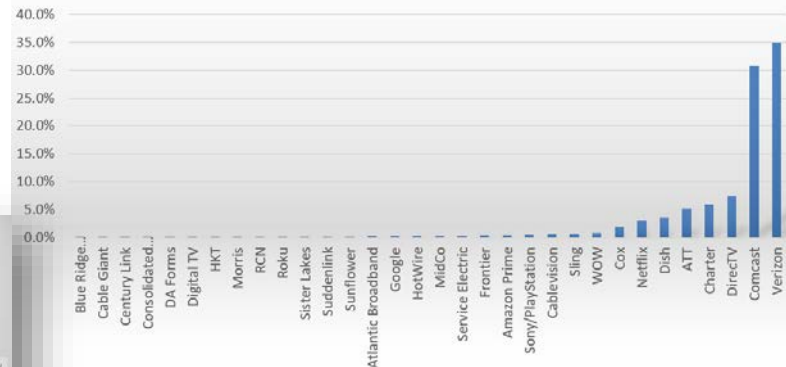
ALL DIRECTV OFFERS REQUIRE 24-MO. TV AGREEMENT. EARLY TERMINATION FEE OF \$20/MO. FOR EACH MONTH REMAINING IN AGMT. \$35 ACTIVATION. EQUIPMENT NON-RETURN AND ADD'L FEES APPLY. NEW APPROVED RESIDENTIAL CUSTOMERS ONLY (EQUIPMENT LEASE REQ'D). CREDIT CARD REQ'D (EXCEPT MA & RI). *Regional Sports Fee Applies in certain markets.

DirecTV

Polled almost 900 US households



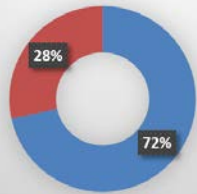
Percentage of Pay TV Respondents by Service Provider



35% Verizon customers
31% Comcast customers
13% ATT/DirecTV
6% Charter

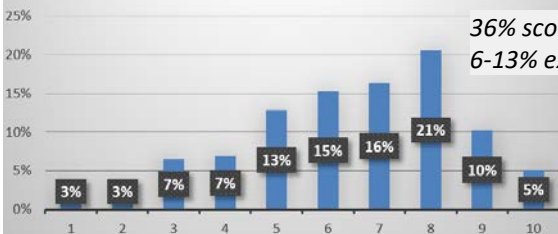
Mary Meeker and Kleiner Perkins are right – kind of....

Actively looking to reduce PayTV cost



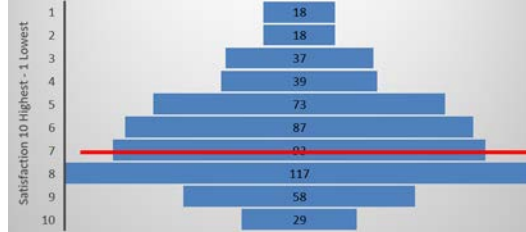
72% actively looking to reduce Pay TV monthly bill
28% not

Overall Pay TV Satisfaction level 1-10 by % respondents



36% scored their MVPD 8-10
6-13% extremely dis-satisfied

Overall Satisfaction Level with PayTV experience



Cost Satisfaction Level with PayTV experience



UX Satisfaction Level with PayTV experience



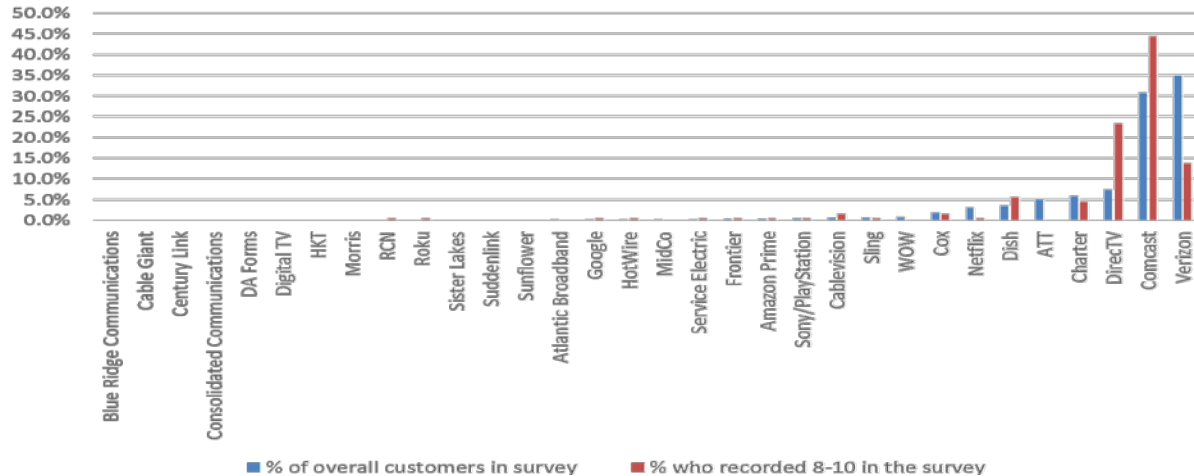
Overall satisfaction level (1-10) was 6.3

Cost Satisfaction : 3.9

UX satisfaction : 6.1

How did the positive customers vote

Service Providers rated 8-10 for overall satisfaction levels
Shown with their overall participation %

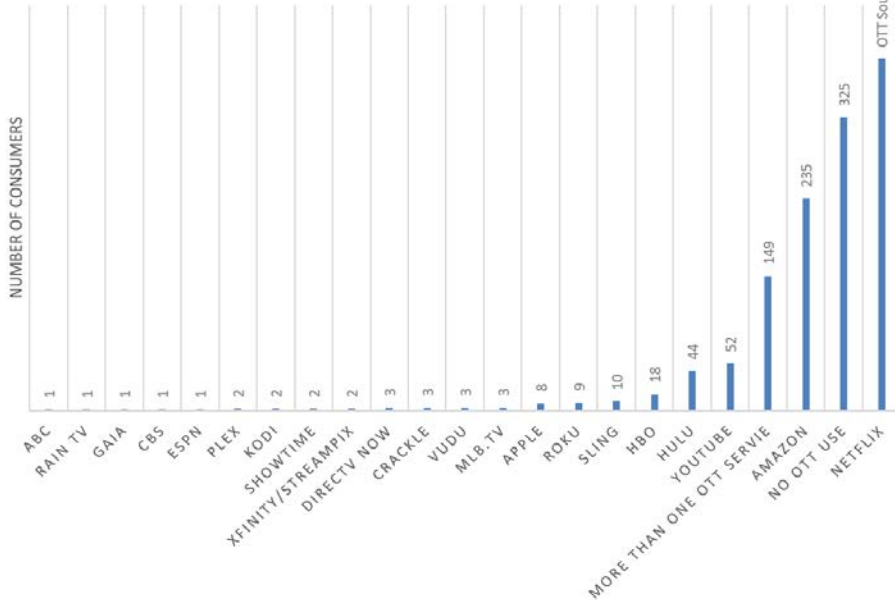


- Comcast, DIRECTV, and Dish had higher number of 8-10 rankings than the proportion of their survey participation
- As a side note, Comcast subscribers with X1 rated their satisfaction levels higher than those that had not yet moved to X1

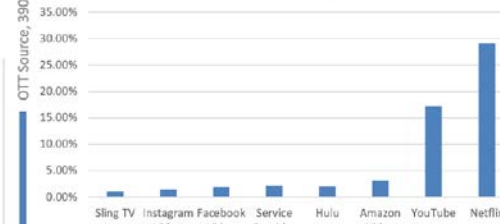
Pay TV and OTT sources collide in Pay TV, too

There are really only 2 sources that count – 4 that make impact

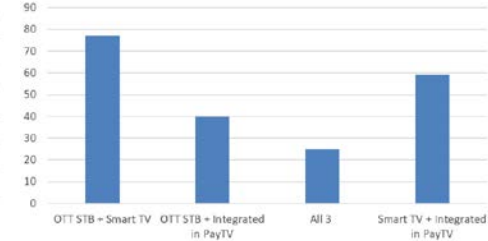
OTT SOURCES USED BY PAY TV SUBS



ARRIS view of Downstream B/W by OTT Video



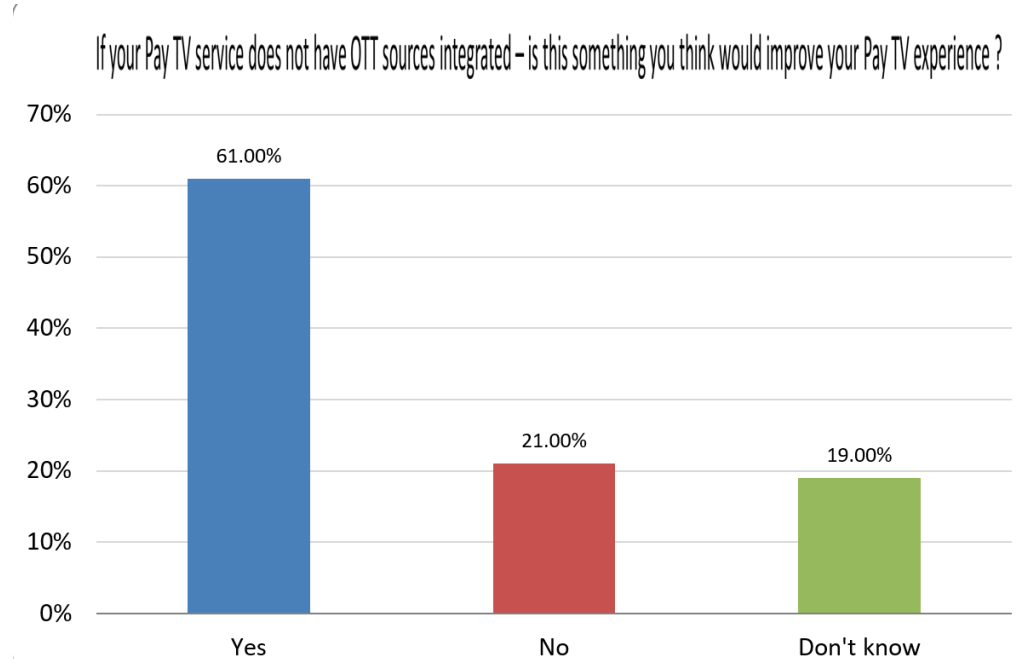
Multiple OTT Devices per Home



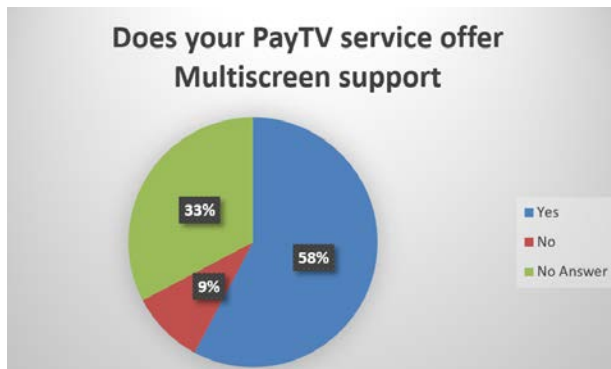
- Subscription rates
 - Netflix 55%; Amazon 33%
 - No paid OTT use 45%
 - More than one paid OTT service – 20%
- Use rates very different
 - Netflix 28%; YouTube 17%
 - Amazon 3%; Hulu 2%

Consumers see big value in integration of OTT sources

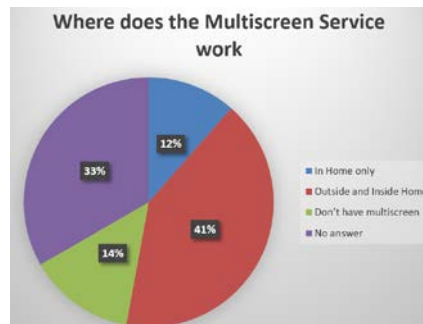
- One of the key feedback items in survey is that consumers value the integration of OTT sources in their aggregated Pay TV system
- They like to stay on same HDMI and keep the same remote interface
- They like metadata shared search and recommendation engines – where they can find all content across all integrated sources
- They are discerning of how this is implemented. Needs to be simple and either inherent in guide or in the search applications



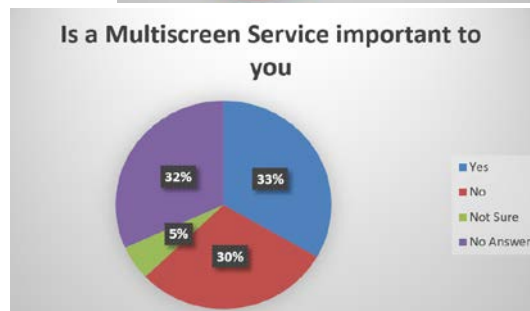
Some confusion on multiscreen services



- 58% had MS service
- 33% did not answer or did not know
- 9% said No



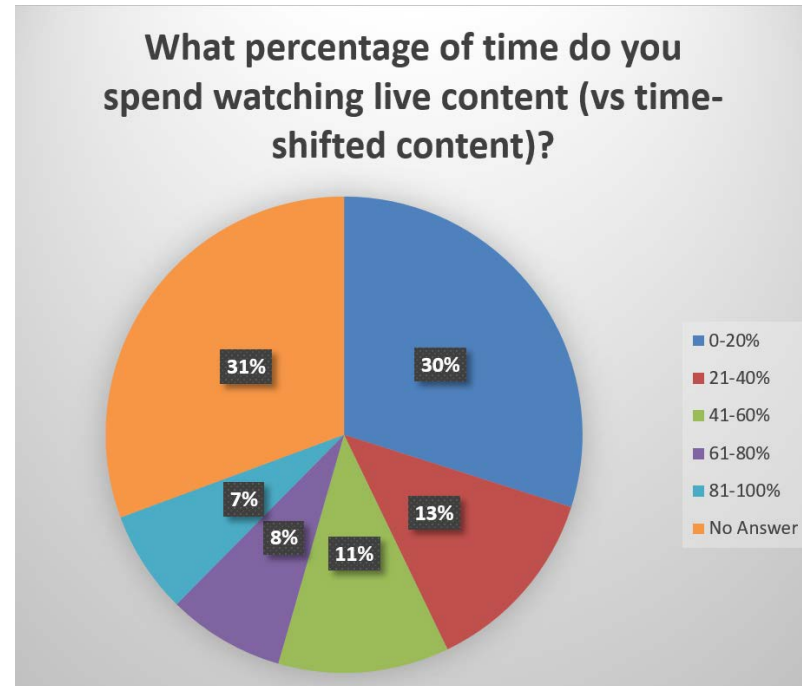
- 17% in-home only
- 41% inside and outside
- 33% did not answer or did not know



- 33% think MS is important
- 30% said No
- 32% did not answer

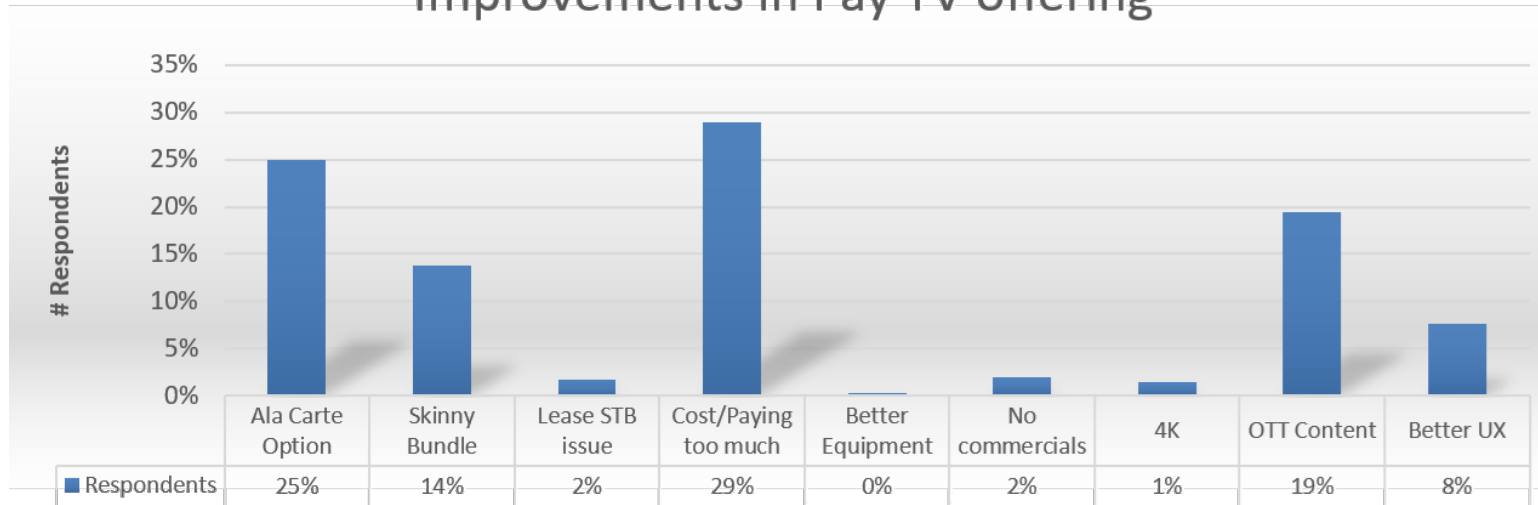
What way do people think they are watching Pay TV

- 30% of people think they watch Live content 20% of time
- 13% watching Live TV up to 40% of the time
- 11% watching Live TV up to 60% of the time
- 8% watching Live TV up to 80% of the time
- 7% watching Live TV up to 100% of the time



Cost and value for money – as expected

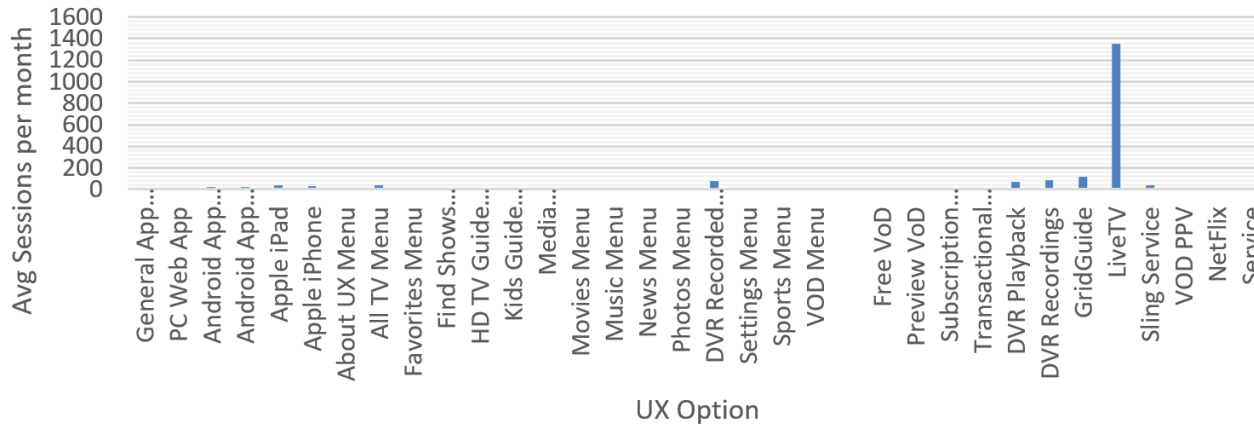
Improvements in Pay TV offering



- Users like a la carte/skinny bundle concepts, because they typically focus their TV watching on 17 channels

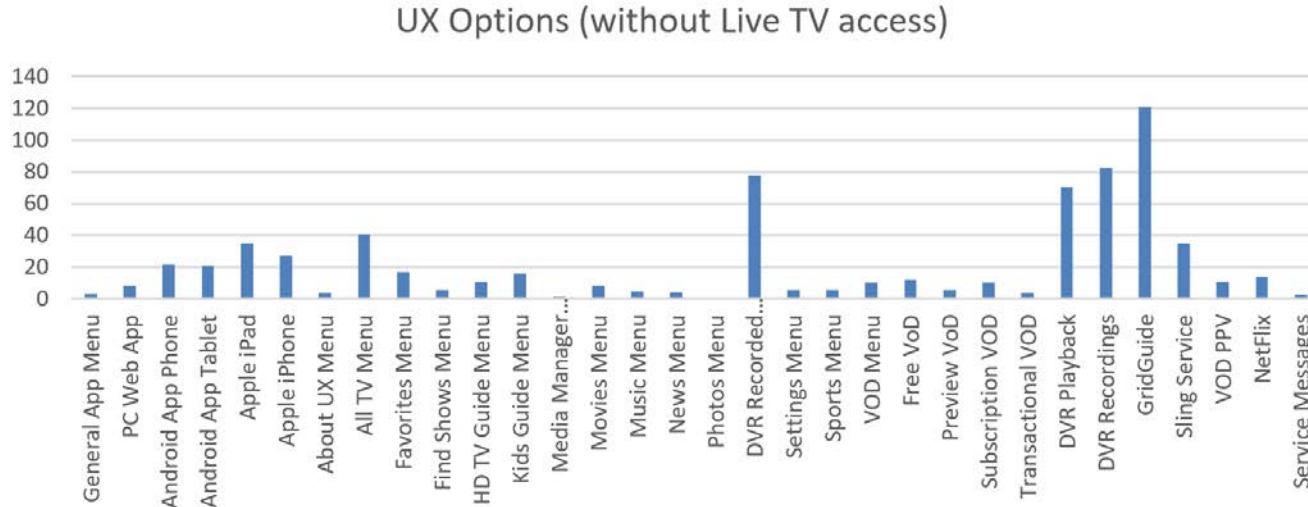
Take a modern Pay TV solution with integrated Netflix....

UX Options chosen on PayTV solution with integrated NetFlix



- Users use the Live TV menu options 10x more than anything else

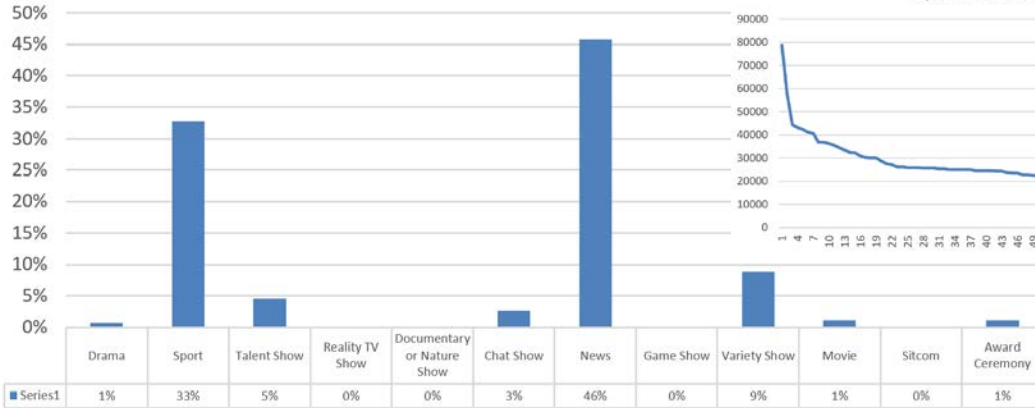
Take a modern Pay TV solution with integrated Netflix....



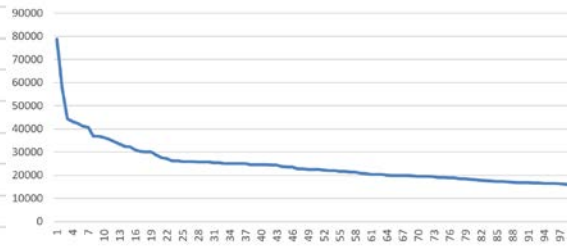
- Leave out Live TV access menu
- Grid Guide (Live TV mostly) and DVR are 2 most used Menus
- Netflix sessions per month are 15.2 per month < 1 per day.

What are people watching – its still mostly Live TV

Live Shows viewed by Genre/Type

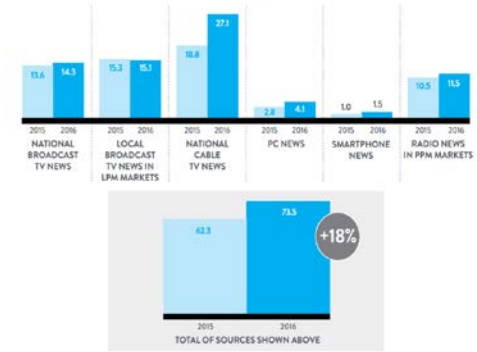


Top 100 Live Show Views - Tail



NEWS CONSUMPTION AMONG ADULTS 18+

WEEKLY GROSS MINUTES OF NEWS CONSUMPTION (IN BILLIONS)



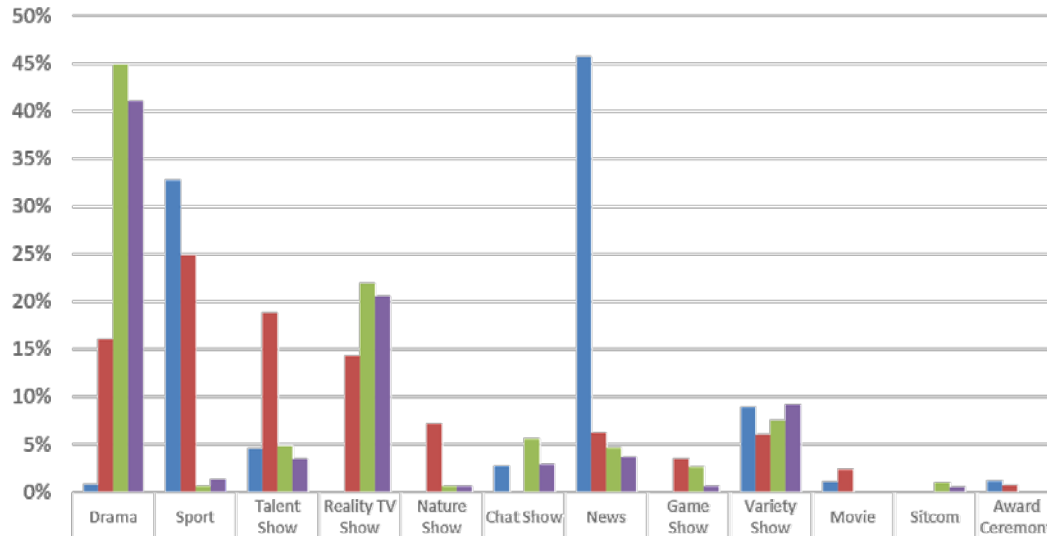
Source: For analysis: National TV News (Nielsen National Television Panel); News summary from cable, Broadcast: ABC, CBS, FOX, NBC, TEI, UNI; Cable: ESPN, CNN, ESPN2, MSNBC; Local TV News (Nielsen 25 LPM Markets); Local news from Broadcast: ABC, CBS, NBC, TEI, UNI; PC News (Nielsen Current Events & Global News subcategory); Smartphone News (EMM Current Events & Global News subcategory); Radio News (Nielsen PPM Markets); 25+ News/TV, All News and Sports News/TV radio stations combined, including 25+ N/A @Market. See page 34 for full viewing.

Source - 2016 Nielsen Total Audience Report
<http://www.nielsen.com/us/en/insights/reports/2017/the-nielsen-total-audience-report-q4-2016.html>

- News and sports dominate most US households. Will this change for Millennials when they change phase of their lives to financial maturity?
- Nielsen also reports the increase in news watching – up 18% from 2015 because of US politics in particular

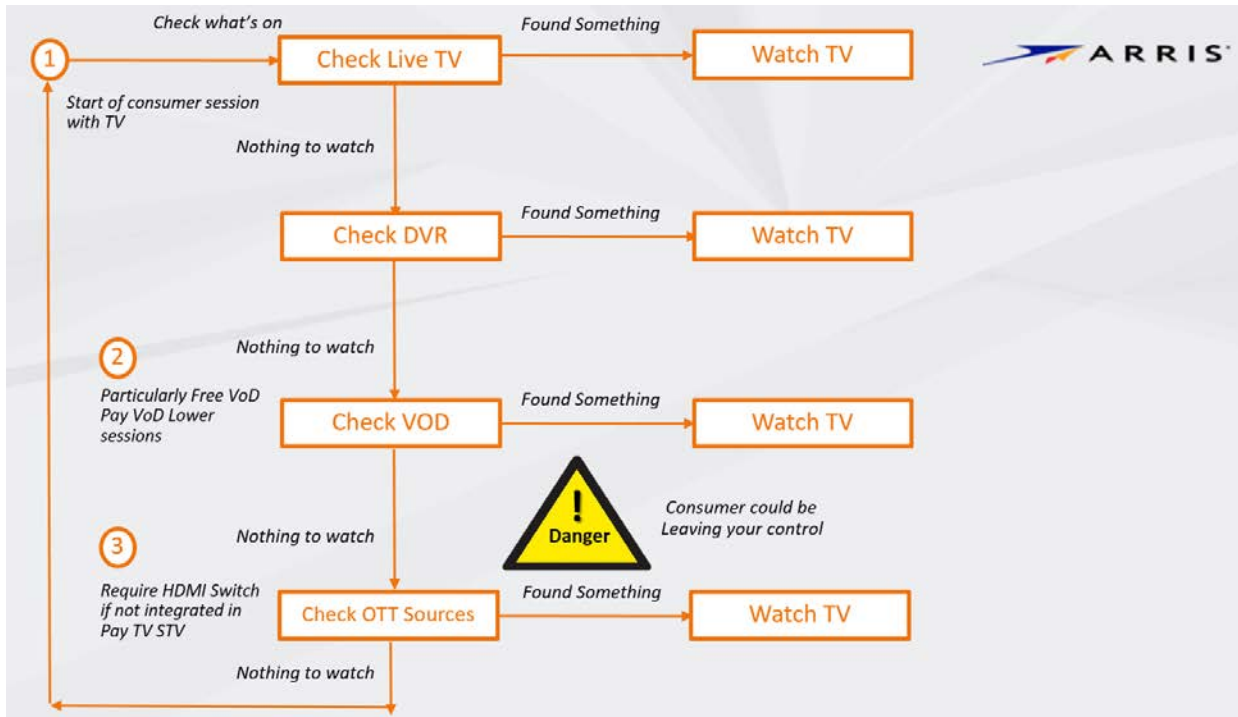
Its different what is scheduled and watched

Comparison of Live, Scheduled, Recorded and Playback of Top 100



- Sports is highest scheduled but lowest playback
 - Backup to live view
- Talent shows are scheduled recorded and spur of moment record
- Drama series are heaviest use for DVR playback

The 90% travelled path – keep this path coming back to MSO



- The key element of the UX is to make sure that the consumer follows this path on
- MSO STB
- MSO HDMI port
- MSO Remote control
- MSO multi-screen app
- MSO mobile app

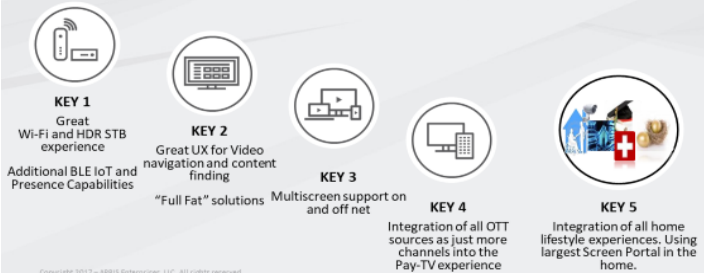
Its all about the perception of value for money

- Consumers will always look for price decreases – don't give them other things to complain about!
- Buying 250 channels and only watching 17 – gives them the belief they are paying for content and channels they don't want or need.
- Solution is to keep them happy enough that they don't do the work to move
- Integrate all sources on your video solution
- Don't lose Remote control or HDMI control
- Add as much anti-churn elements through overall 'Full Fat' User experience – from content, STB/TV UX, Remote Control UX and even integrate smart lifestyle services into the 'Screen experience.'

The key elements to ensure ownership of the customer eyes

- Simple and intuitive direction that can work – and will distract the consumer from the cost of Pay TV
- Think of services to the screen vs video to the screen – and add new lifestyle services like Health, Education, Home Security
- the user interface and both graphic, voice input and audio output are becoming more important to unify and aggregate the Home Lifestyle services
- The STB is the enabler and portal to own these home screens

5 Step Plan to owning the largest screens in the home for new services



SET TOP EVOLUTION ADDITIONAL FUNCTIONALITY



Control, quality and ownership of the largest screen

- Strategy should be to own the largest screens in the home
- TV is changing to screen + Media Box
- Will go to all Wall TV and become the control point of the home and all services including video
- Lifestyle and Home services will be integrated into the video/TV experience
- Don't lose the control of this evolution to all wall console in the next 5+ years.

Taking ownership of the largest screen in the house – simple STB

My TV UX
My Favorite OTT Sources

MSO STB

My Favorite MSO

NETFLIX hulu PlayStation
sling amazon DIRECTV

Addition of MSO STB

- Takes ownership of TV Pixels
- Improves Wi-Fi delivery to TV
- Creates a Home Portal environment for new services

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Low cost STB owns the most valuable large screen real estate. Don't lose this screen ownership!

Don't lose the selection of content/service ownership by not having remote control!

The change from TV to Screen

Already here

Moving here

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The change from TV to Screen

Already here
LG Flexible OLED Displays

Moving here
Full Wall Portals with ability to create sections

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The TV is separating to screen and media box

- ❑ The screens are going thinner
- ❑ Dropping the media and connectivity electronics into separate Media Box
- ❑ Media Box connected to screen via new 'power and led setting' cable
 - ❑ Is this the new HDMI input
- ❑ Separate Media Box contains all decode, Wi-Fi connectivity, sound and input port functionality
- ❑ How does the MSO intersect with this direction?

FUTURE OF SCREEN + TV + STB

H/W Functions separating from Screen to make it thinner. Eventually Full Flexible OLED/AMOLED

STB and Media Processing Functions separated to new device that includes audio, Wi-Fi, HDMI In and Single Ribbon Cable to Screen

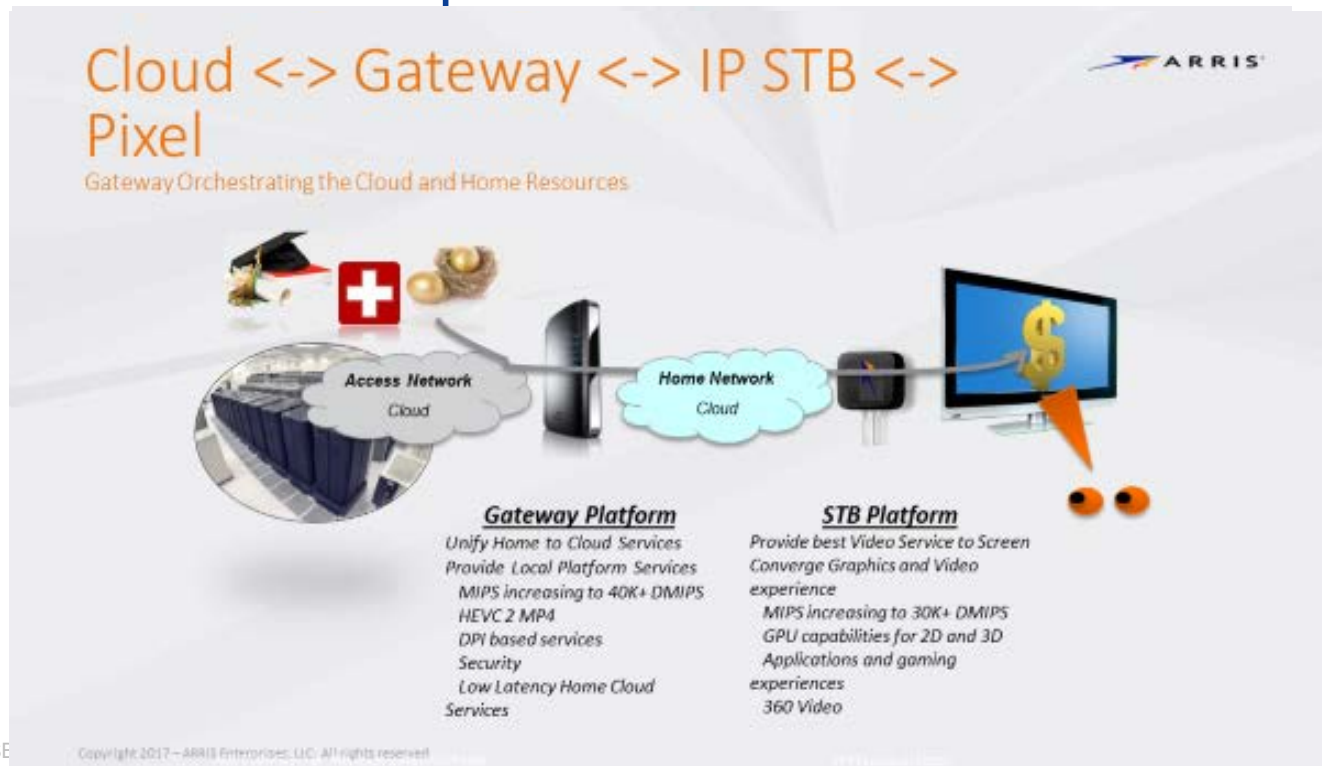
Rethink of how an additional STB gets added in this ergonomic environment

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5

The slide features several images: a hand holding a bundle of green ribbon cables, a woman interacting with a large screen, a close-up of a media box, and a long, thin device (likely a media box) on a wooden surface. A speech bubble contains the text 'Rethink of how an additional STB gets added in this ergonomic environment'.

The consumer is the prize for investment in UX



All enabled by the STB

Driving services to the screen

Virtual Reality is another form of TV and UX

Sport and Virtual Reality

Is Bringing the Best Stadium Seat to the Home Going to Work?



Front Row Seating at Sporting Events

Can you sell the best seat in the house a million times?
Is the VR stadium seat better than the curated broadcast experience?
New immersive locations?
Mix of 'being there' and curated camera angles?
Boxing a better candidate than football?

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Future Potential VR CPE Architecture ?



- Integrating the VR/AR HMD experience with the TV/screen platform in the home
- HMD usage driving 360 viewing on the STB driven screen as well

Its all about keeping the customer happy

- ❑ Integrate OTT sources in your UX
- ❑ Don't lose control of remote or HDMI port
- ❑ Focus on better UX as balance to cost grumblings
- ❑ Add in new services on the STB/TV that also distract from cost of just video
- ❑ Make the screens in the home drive revenue for you
- ❑ Add in new Home Lifestyle services
- ❑ On the journey to all wall TV – don't lose the ability to add your own controlled STB to own this new portal

Maybe the Future Home Will Look Like This:

Wireless MicroNode in Every Room

The diagram illustrates a smart home network architecture. At the top, a **Wired Backbone – 10 Gbps Wireless Backhauling Solutions** connects to a **10 Gbps WAN**. This backbone feeds into three rooms: a garage, a kitchen, and a living area. In the garage, a **10 Gbps Access Speeds** node is shown. In the kitchen, **IoT Devices** are connected. In the living area, a **Wireless HDMI Gbps+ Wi-Fi** node is shown. A **VR Experience @ 4K** is also depicted. A **MicroNode** is highlighted with the text: *Elegant design to ensure device has best out front location in room*. A **NTU** (Network Termination Unit) is shown with specifications: **xPON D3.1++ 10 Gbps+**. A **Wireless MicroNode** is shown with specifications: **60GHz 802.11ax BLE 802.15.4 MoCA 3.0 STB and VR video & graphics processing**.

NTU
xPON
D3.1++
10 Gbps+

MicroNode
Elegant design to ensure device has best out front location in room

60GHz
802.11ax
BLE
802.15.4
MoCA 3.0
STB and VR
video &
graphics
processing

10 Gbps WAN

Wired Backbone – 10 Gbps Wireless Backhauling Solutions

10 Gbps Access Speeds

IoT Devices

Wireless HDMI Gbps+ Wi-Fi

VR Experience @ 4K

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THANK YOU!

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