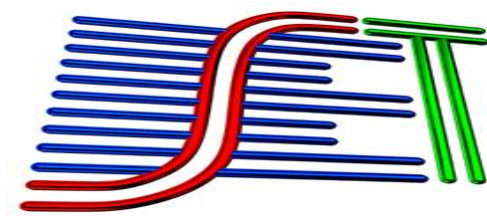


Digitalização do Radio e TV :Cenários e oportunidades

Congresso Abratel de Comunicação

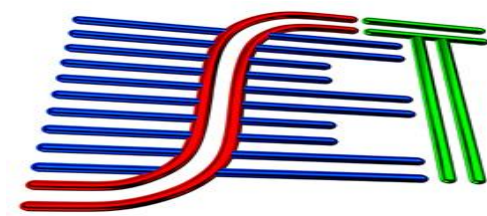
O Futuro da Comunicação na Era Digital

Agenda

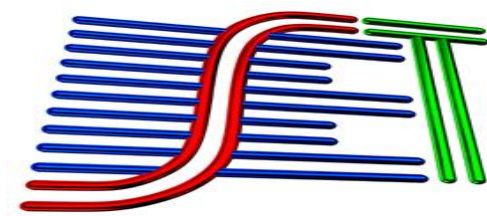


- Diferenciais competitivos do sistema brasileiro em relação aos demais sistemas no mundo
- Desafios da convivência entre TV digital e as novas redes móveis
- O que mais podemos esperar de avanços tecnológicos na TV
- Como criar sinergia entre o broadcast e o broadband

Agenda

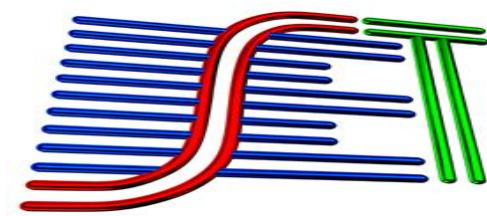


- Dependência de 5G para atender complementariedade de redes de Broadcast e de serviços móveis : Pagar para distribuir ?! Perda de vantagem estratégica ?! Custos adicionais ?!
- O que Inteligência artificial , Realidade Virtual , Machine Learning , Mídias Sociais e Inovações podem potencializar as produções ?
- Valorização dos conteúdos próprios . Programação ao vivo tem longa vida
- Futuro do televisor da sala ? O que os dispositivos móveis causam nos hábitos de consumir média ?



Diferenciais competitivos

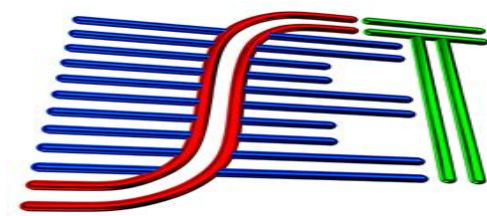
- O ISDB-Tb, na versão brasileira, é o padrão mais avançado para 2K.
- É robusto, flexível , possui qualidade e capacidade.
- A adoção do Mpeg-4 capacitou-o em qualidade e capacidade.
- Permite recepção móvel através do One Seg e até mesmo com Full Seg.



Diferenciais competitivos

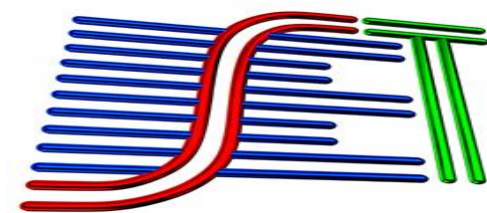
- Tem capacidade para dados : Interatividade
- O padrão ISDB- Tb está atualizado
- O Fórum SBTVD cumpre bem o papel de harmonizar as normas e integrar com o ISDB internacional
- A versão do ISDB-Tb é muito superior ao ISDB-T no Japão, por estar ainda estar em MPEG -2. O ISDB-Tb está em MPEG-4

Diferenciais competitivos



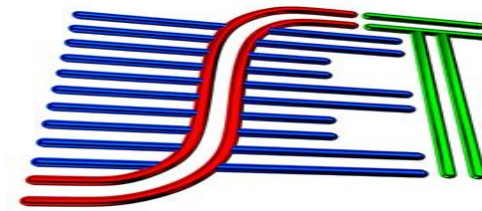
- Preços dos STBs estão bastante baixos
- Preços dos televisores são atrativos
- Vídeo proveniente do ISDB- Tb mesmo em Up-Scale para televisores de 4K são de alta qualidade.
- A Televisão digital terrestre alavancou o mercado de TV em alta definição: TV por assinatura tirou proveito. Mídias em alta definição aumentaram mercados. Fabricantes de TVs venderam para todos estes mercados.

Frustações



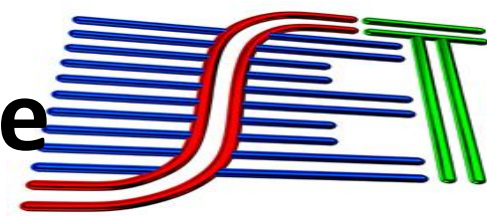
- One-Seg não decolou como poderia. OTT e novos padrões de TV Terrestre viabilizam o caminho para mobilidade
- Resistências dos fabricantes de celulares em prover receptores de ISDB-Tb
- Interatividade Ginga perdeu o timing
- Resistências das emissoras de TV
- Smart TVs dominaram com maior capacidade e soluções proprietárias.

Desafios da convivência entre TV digital e as novas redes móveis



- Dependência de 5G para atender complementariedade de redes de Broadcast e de serviços móveis :
 - Pagar para distribuir ?!
 - Perda de vantagem estratégica ?!
 - Custos adicionais ?!
- Fracasso do **FoBTV** na alavancagem de um padrão único de TV Terrestre Mundial

As propostas das teles para 5G e clientes de broadcasting ?



- Fixo e móvel
- Redes de broadcast
- Potencializado para aplicações atuais
- Prometem : Multimídia / Entretenimento / Connected Automotive/ Internet of things (IoT) / Ewbs
- Consórcio existente envolvendo diversos players europeus



FOBTV Meeting

IBC 2017

David Gomez-Barquero, Universitat Politècnica de València
Room D201, Hall Elicium, RAI, Amsterdam, The Netherlands
17-09-2017

Contents



- Broadcast in 5G
- eMBMS Evolution in 4G LTE
- 5G in 3GPP
- The 5G-Xcast Project
- Outlook on 5G Broadcast

UNPRECEDENT
COMMUNICATION
CAPABILITIES

OPPORTUNITY FOR THE
CONVERGENCE OF FIXED,
MOBILE AND BROADCAST
NETWORKS

DRIVEN
BY NEW
USE CASES

5G

DESIGNED FOR
NEW VERTICAL
INDUSTRIES

Broadcast in 5G



BROADCAST/MULTICAST PTM TRANSMISSIONS ARE KEY IN MANY 5G USE CASES!

- As built-in delivery optimization tool, not as a service

MULTIMEDIA & ENTERTAINMENT



UHDTV delivery
VR and AR

CONNECTED AUTOMOTIVE



Infotainment
Safety

INTERNET OF THINGS

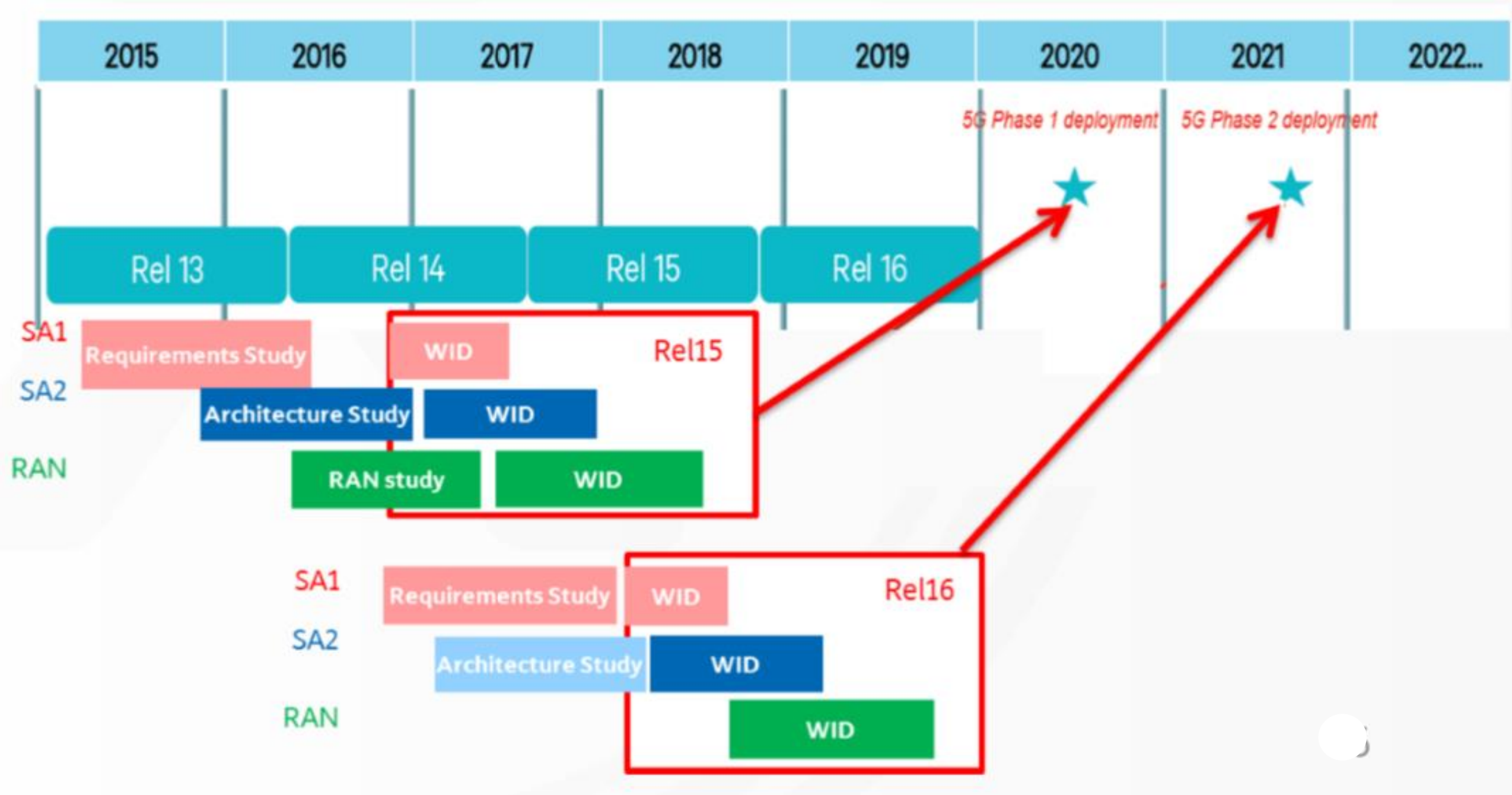


Software Updates
Common Control
Messages

PUBLIC WARNING AND SAFETY



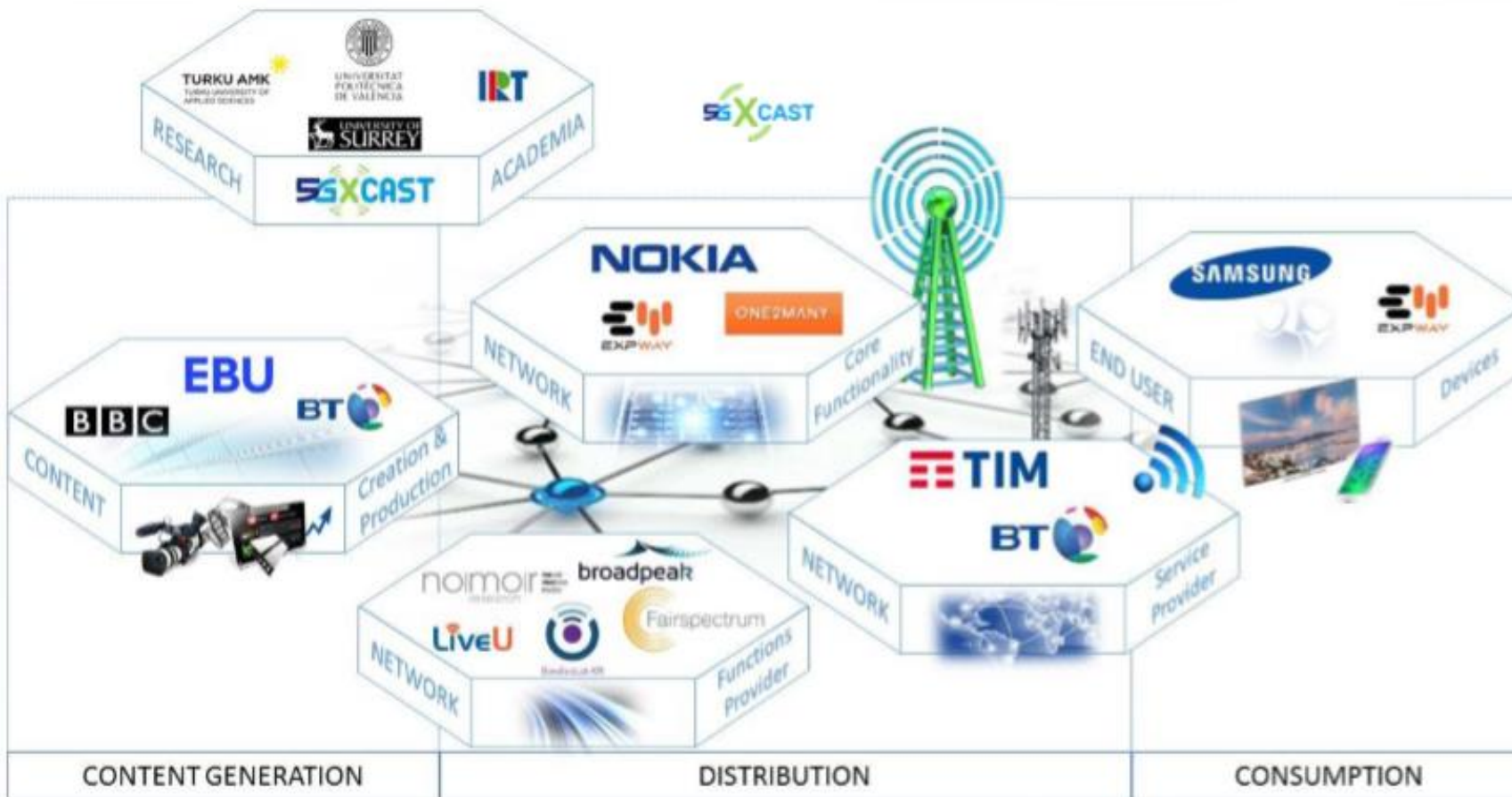
Public Warning System
Tsunami and
Earthquake Alert



Consortium



Media & Entertainment Value Chain



CONTENT DISTRIBUTION FRAMEWORK

Network-agnostic, Combining unicast, multicast, broadcast and caching for **dynamic network resource optimisation**. **Simple interface** between content service provider and network operator

PROOF-OF-CONCEPT PROTOTYPES

For the **5G-Xcast radio, transport** and **application layer** key components

x4

Test-beds

5GIC (Surrey, UK); IRT (Munich, Germany); TUAS(Turku, Finland); BT (London, UK)

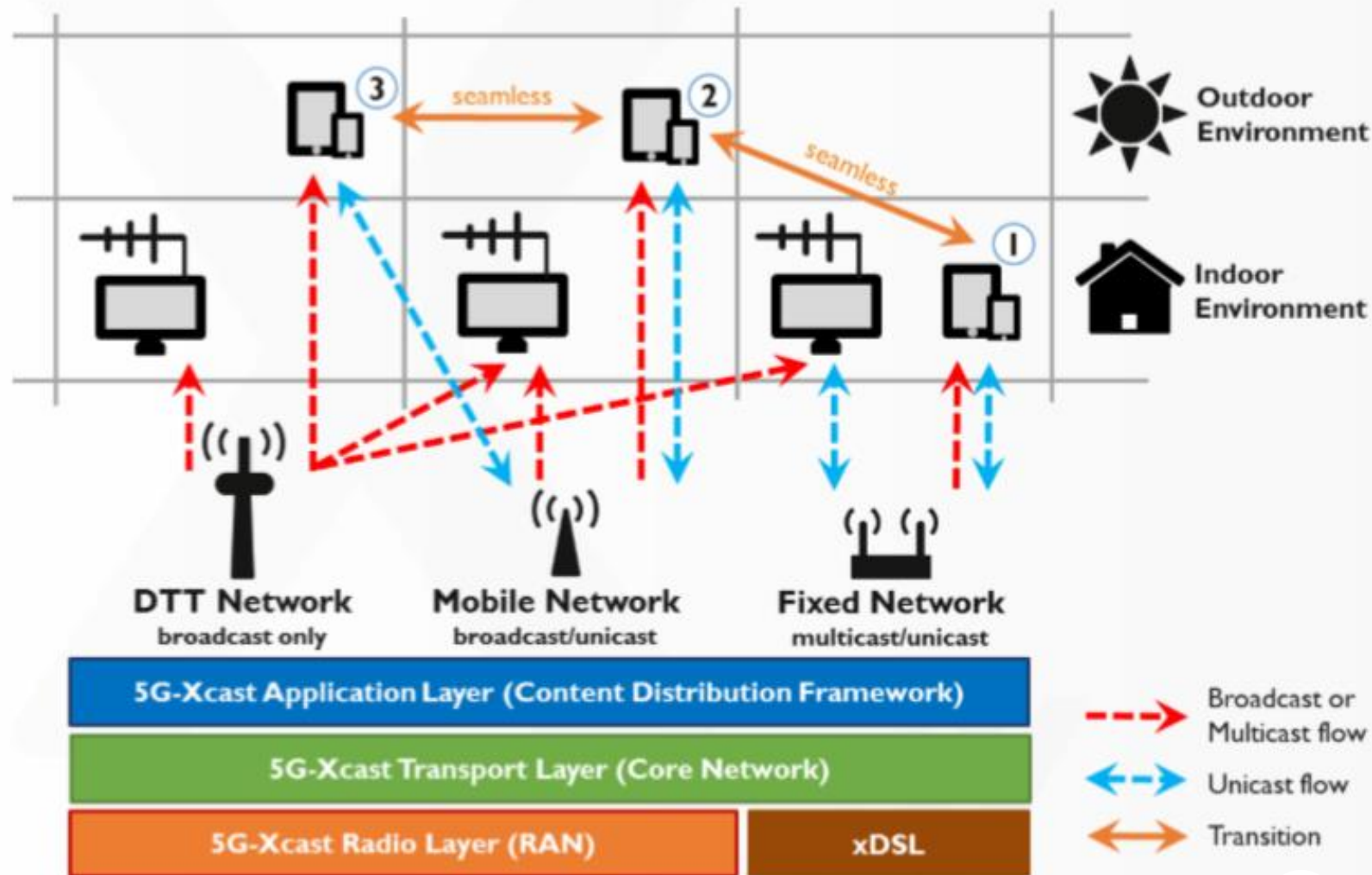
CHANGE OF PARADIGM

Treat **multicast, broadcast and caching** as **built-in internal network delivery optimisations** not as a service to be offered to content service providers.

Network slice broadcast service that would use PTM capabilities.

5G XCAST Convergence Vision

The **converged media delivery architecture** of 5G-Xcast over fixed broadband, mobile broadband and terrestrial broadcast networks allows a **seamless, uninterrupted service** to be offered to the users as they move.



IEEE International Symposium on Broadband Multimedia Systems and Broadcasting

June 5th – 8th 2018, Valencia, Spain

The IEEE International Symposium on Broadband Multimedia Systems and Broadcasting 2018, the 13th in the series, will be held in Valencia, Spain. The symposium is the premier forum for the presentation and exchange of technical advances in the rapidly converging areas of multimedia broadcasting, telecommunications, consumer electronics, and networking technologies.

2018 will be the year of the first normative specifications of the fifth generation of wireless systems 5G, and IEEE BMSB 2018 will have a one-day tutorial on emerging 5G multicast and broadcast technologies and applications.



- 5G-Xcast one-day tutorial and workshop on 5G Broadcast

5G-Xcast Consortium

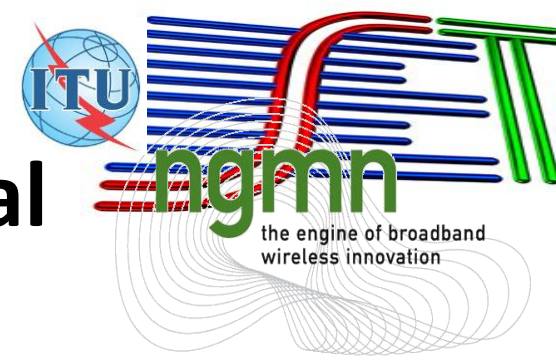


- Universitat Politècnica de València (UPV)
- Nokia Solutions and Networks OY
- Nokia Solutions and Networks Management International GmbH
- British Broadcasting Corporation (BBC)
- British Telecommunications Public Limited Company (BT)
- Broadpeak
- BundlesLab Kft
- Expway
- Fairspectrum OY
- Institut für Rundfunktechnik GmbH (IRT)
- LiveU Ltd.
- Nomor Research
- One2Many
- Samsung Electronics (UK) Limited
- Telecom Italia
- Turun Ammattikorkeakoulu OY (TUAS)
- Union Européenne de Radio Télévision (EBU)
- University of Surrey 5GIC





Why IMT- 2020 (5G) ?



“Web-Scale IT”: Competitive Survival

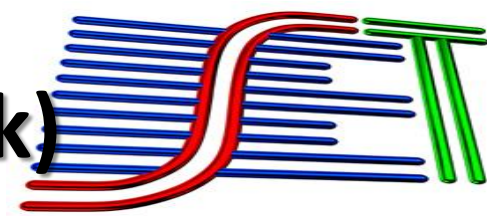
- Telecom (5G) realizes **Web-Scale IT players** are real competition and are re-inventing their business towards 5G to have Web-Scale IT Architecture
- 3GPP 5G proposes **New Technology** and **New System Architecture**
- For **Broadcast to be competitive** with the real disrupters in an all IP World , **YES** a new **Broadcast System Architecture** aligned with Internet and towards 5G is needed using a **“Community Cloud Model”** in USA is the Architecture



Real Competitors



Emerging 5G (New Architecture Re-Think)



Example: NGMN 5G Whitepaper 2015

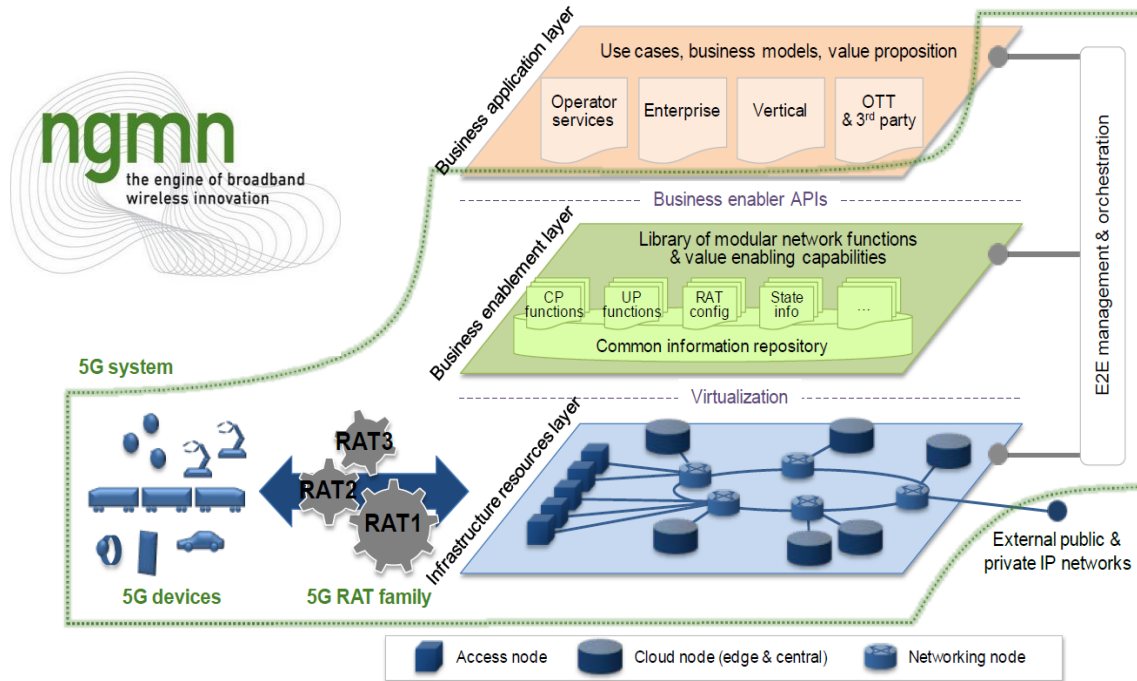


Figure 8: 5G Architecture

Global Published 5G Visions

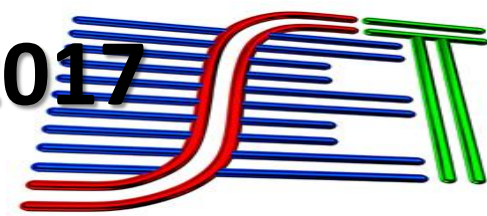


- **Leverage IT Infrastructure**
 - Servers, Storage, Network (COTS)
- Abstraction using **Open Source Software**
 - OpenStack, OpenDaylight, ONAP, Others
- **SDN/NFV** Programmatic 5G Platform
- **CLOUD-RAN**
 - Process Waveforms Datacenter

Sinclair's Mobile First Vision 2017: New Broadcast Architecture and Technologies aligned Emerging 5G

Open Source is now Mainstream Telcom 2017

ONAP Project (SDN/NFV)



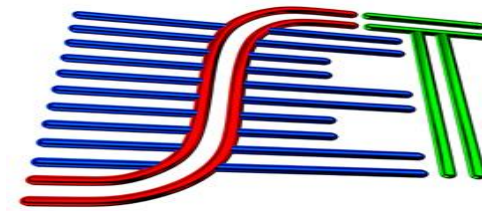
April 6, 2017 Contributes 8.5 Million Lines of Code into ONAP



“Now is the point in time to be thinking Broadcast Waveforms in Cloud”

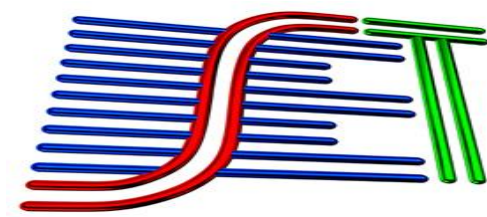


O que mais podemos esperar de avanços tecnológicos na TV



- VR – Realidade virtual
- AI – Inteligência artificial: mudando percepção
- AR – Realidade aumentada
- Voice – Reconhecimento de voz- Comandos(50% das buscas serão por voz em 2020)
- Bots : conversando com robots
- IoT : Internet das coisas na obtenção de dados

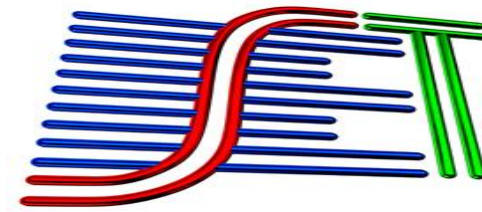
O que mais podemos esperar de avanços tecnológicos na TV



- OTT
- Valorização do conteúdo próprio
- Não depender de terceiros para distribuição e faturamento
- Soluções existentes para armazenagem em nuvem, acesso, controle e billing.
- Acesso ao vivo e de pré-gravados
- Target Advertizing



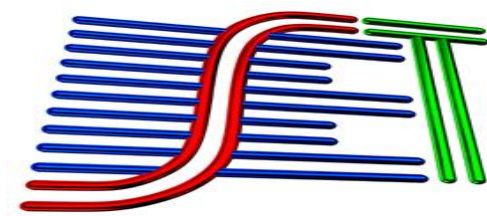
WAVE
WEB APPLICATION VIDEO ECOSYSTEM



The WAVE Project for Global Streaming Media Interoperability

Mike Bergman

Sr. Director, Technology & Standards
Consumer Technology Association



About CTA

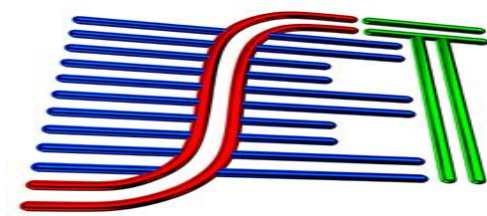
- Consumer Technology Association (CTA)[™]
- Formerly: Consumer Electronics Association (CEA)[®]
- Trade association with 2,200+ member companies
- Policy advocacy / [market research](#) / technical education / industry promotion / standards development / *more*
- Owns and produces CES[®]

More at at www.CTA.tech

WAVE OTT Interoperability Project

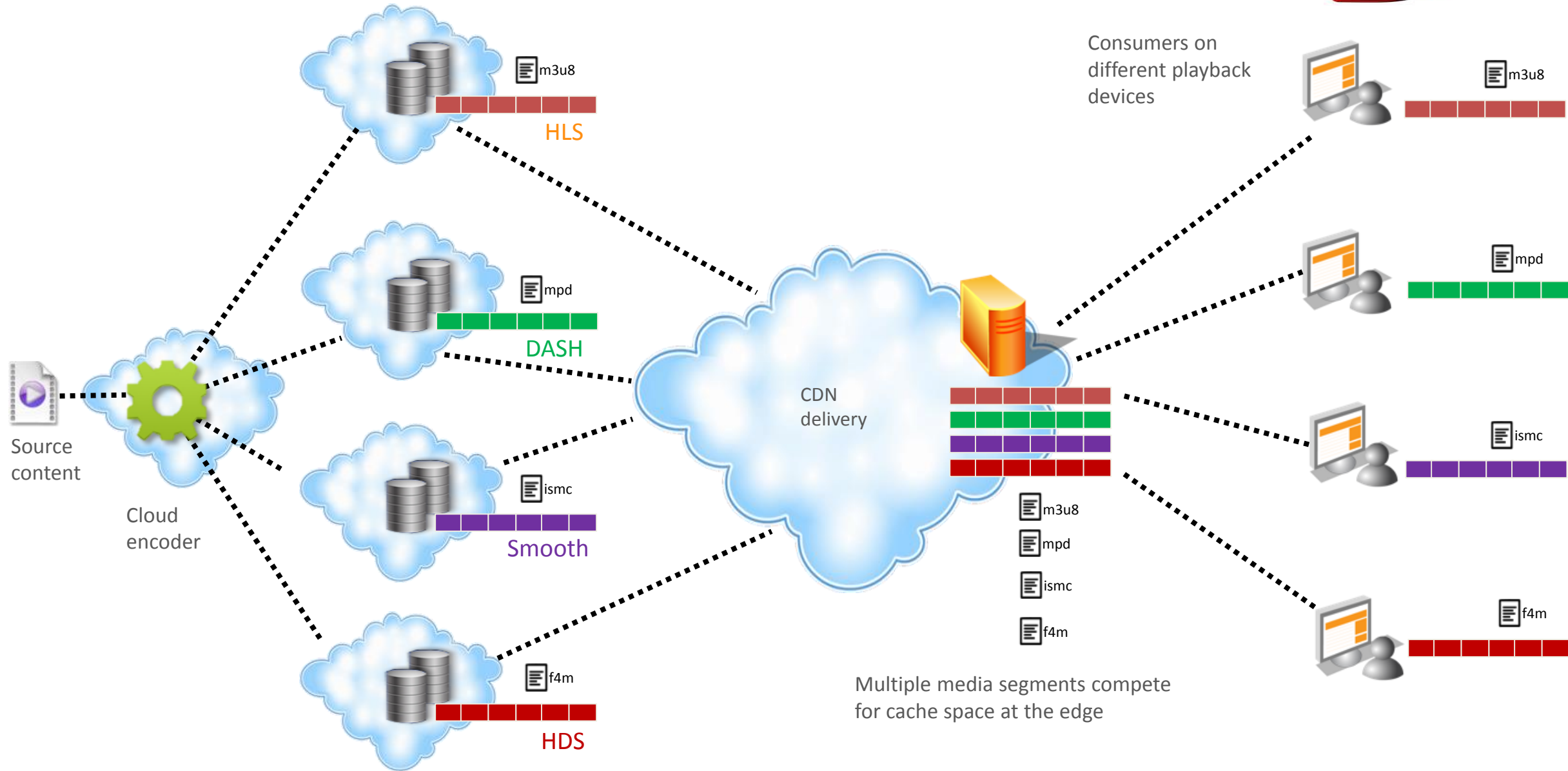
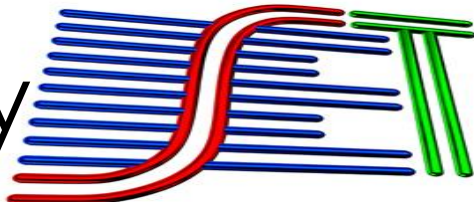
- **Adobe Systems**
- AGP
- **Akamai**
- Amazon.com
- **Apple**
- AT&T
- AwoX
- BBC Research & Development
- BitRouter
- BrightCove
- Cable Television Labs
- castLabs
- **Comcast Cable**
- Consumer Technology Association
- Cox Communications
- Discovery Communications
- Disney/ABC/ESPN
- Dolby Laboratories
- DTS
- Ericsson
- Eurofins Digital Testing
- Facebook
- Fraunhofer
- **Google**
- Home Box Office (HBO)
- Intel Corporation
- JW Player
- **LG Electronics**
- **Microsoft Corporation**
- **MLBAM**
- Motion Picture Association of America
- Motion Picture Labs
- Nagravision
- National Association of Broadcasters
- Netflix
- Opera Software
- P Thomsen Consulting
- **Qualcomm Incorporated**
- RK Entertainment Technology Consulting
- **Samsung Electronics**
- Sharp Electronics Corporation
- **Sky**
- Society of Cable Telecommunications Engineers
- Solekai Systems
- **Sony Electronics**
- SpireSpark International
- **Starz**
- Streamroot
- TBT
- Toshiba
- **TP Vision Holding B.V.**
- Ustudio
- Verance Corporation
- Verimatrix
- Verizon
- Viacom
- Vizio
- WJR Consulting
- World Wide Web Consortium
- **WWE**

*Company names in **bold** are members of the WAVE Steering Committee.*

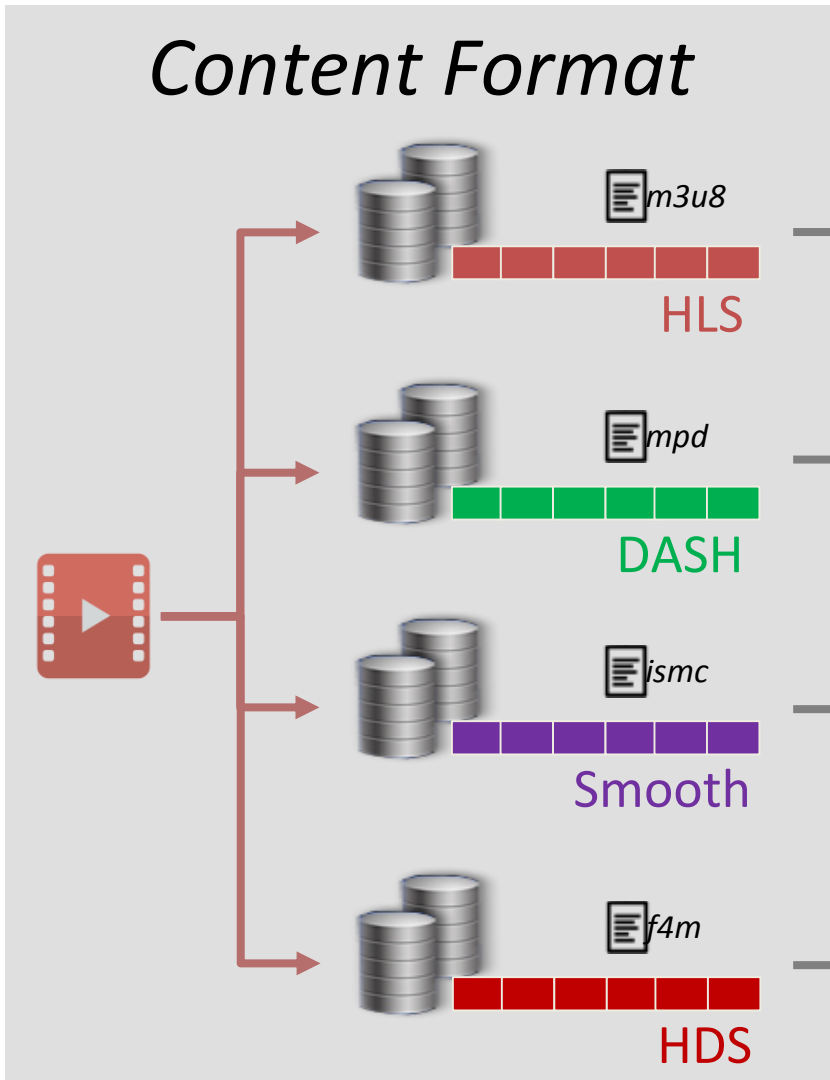


The Problem and The WAVE Solution

Multi-platform OTT workflow today



Commercial OTT Video Issues: Content Format Issues



Each “asset” copied to multiple media formats

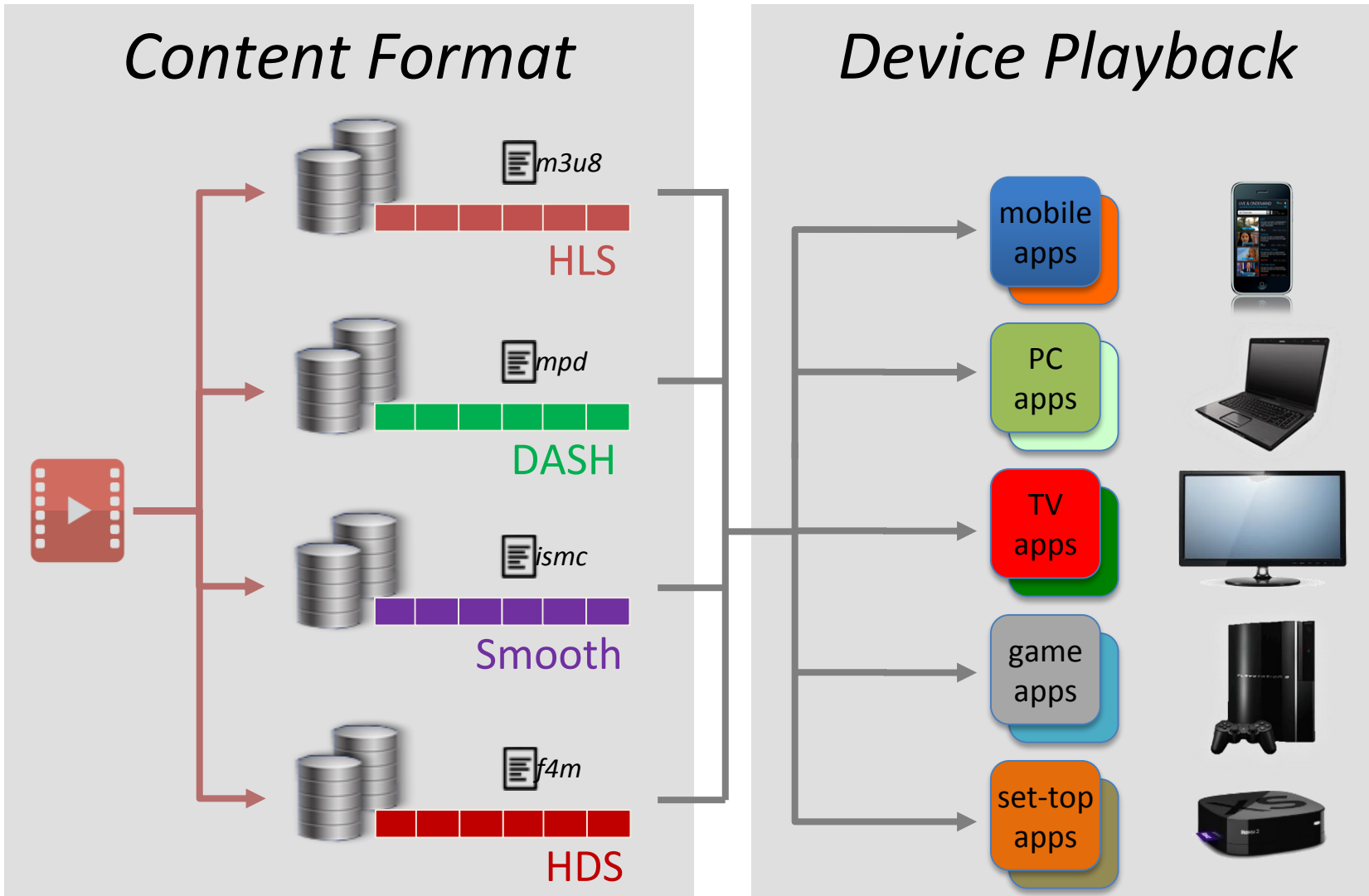
- different video codecs
- different audio codecs
- Regional frame rates

Cost to content creators and distributors

Inefficiencies in content delivery networks (CDNs)

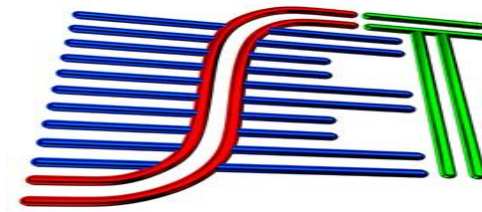
Storage costs

Commercial OTT Video Issues: Device Playback Issues



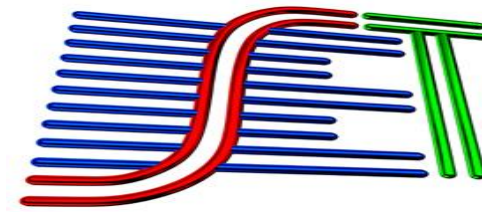
- Codec incompatibility
- Partial profile support
- Request protocol deficiencies
- Switching bitrate glitches
- Scaling display issues
- Audio discontinuities
- Long-term playback instability
- Memory problems
- CPU weakness
- Variable HDR support
- Unknown device capabilities
- Ad splicing problems

Identificando os pontos chaves



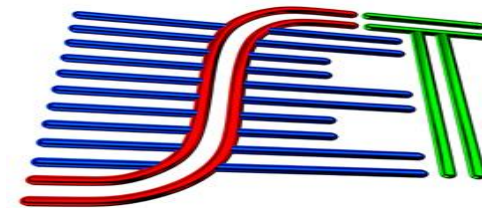
- Mudança contínua para o conteúdo convencional da qualidade da imagem (qualidade tomada mais por garantia)
- Foco no que é feito e como se faz isso, nem tanto foco na tecnologia subjacente
- Tecnologia habilitada e não orientada para a tecnologia somente. Negócios e eficiência operacional são os motivadores

Identificando os pontos chaves



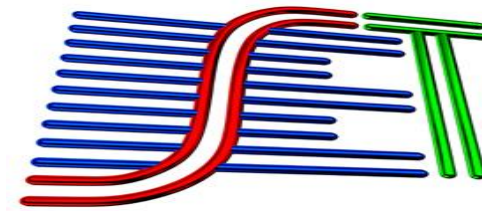
- UHD /4K é agora comum, mesmo que HD e SD estão ainda em uso.
- É provável que aumente ainda mais, pois sistemas baseados em TI são flexíveis e podem lidar com múltiplos formatos simultaneamente.
- Motivarão a necessidade de maiores capacidades de processamentos e de armazenagens.
- Algum mérito aumentando a resolução ainda mais? Esperando razões inovadoras para torná-lo atraente ?

Identificando os pontos chaves: transição para TI e IP



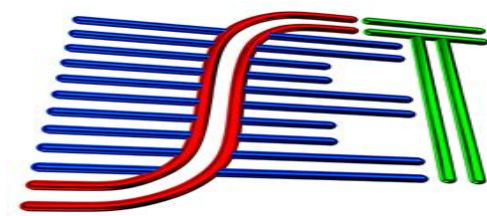
- Transição para TI e IP estão indo bem !
- Padrões estão disponíveis para todas as etapas
- O grupo AIMS é realidade
- A mudança para TI abre as portas para mais automação.
- Qual é o papel da inteligência artificial ?
- Mas isso é apenas um passo para a nuvem?

Identificando os pontos chaves: Propaganda / Marketing



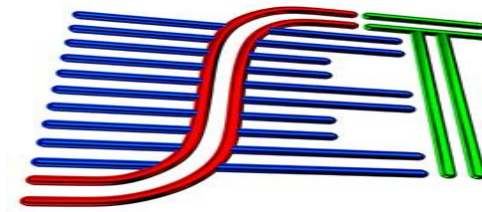
- Consumo de vídeo está mudando
- Mais opção: menos dependência no broadcast tradicional. Especialmente milênios .
- Broadcast tradicional gera lucro , mas está no caminho para uma queda lenta e demorada, mas definitiva. Mais vídeos ao vivo do que broadcast.
- Aumento do uso de dados analíticos e de personalização.
- Encontrando novos caminhos de inovações para gerar oportunidade de negócios.
- A grande promoção da marca ainda é importante, mas a segmentação, a fragmentação e muitos dados podem levar à paralisia em troca de análise.

Conteúdo premium: o que significa para os anunciantes



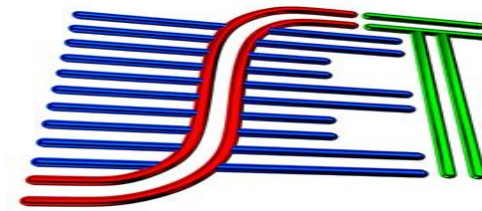
- Eficiência
- Impacto
- Emoção
- Segurança da marca
- Engajamento
- Transparência
- Criatividade

Identificando os pontos chaves



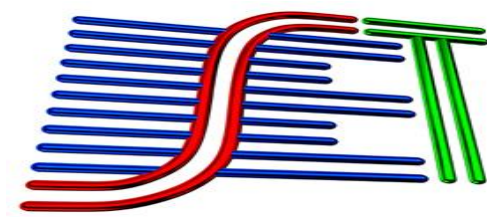
- Realidade virtual é a nova onda ! O que será em 2018 ?
- Estaremos consumidos pela internet das coisas (iOT) ? Ou seremos parte de uma grande onda ?
- Nós estamos vendo video no trem, no onibus e talvez no carro quando ele for autônomo .
- O broadcast é ainda relevante. O último bastião são eventos ao vivo, mas muito caro para seguir em frente ?

Identificando os pontos chaves



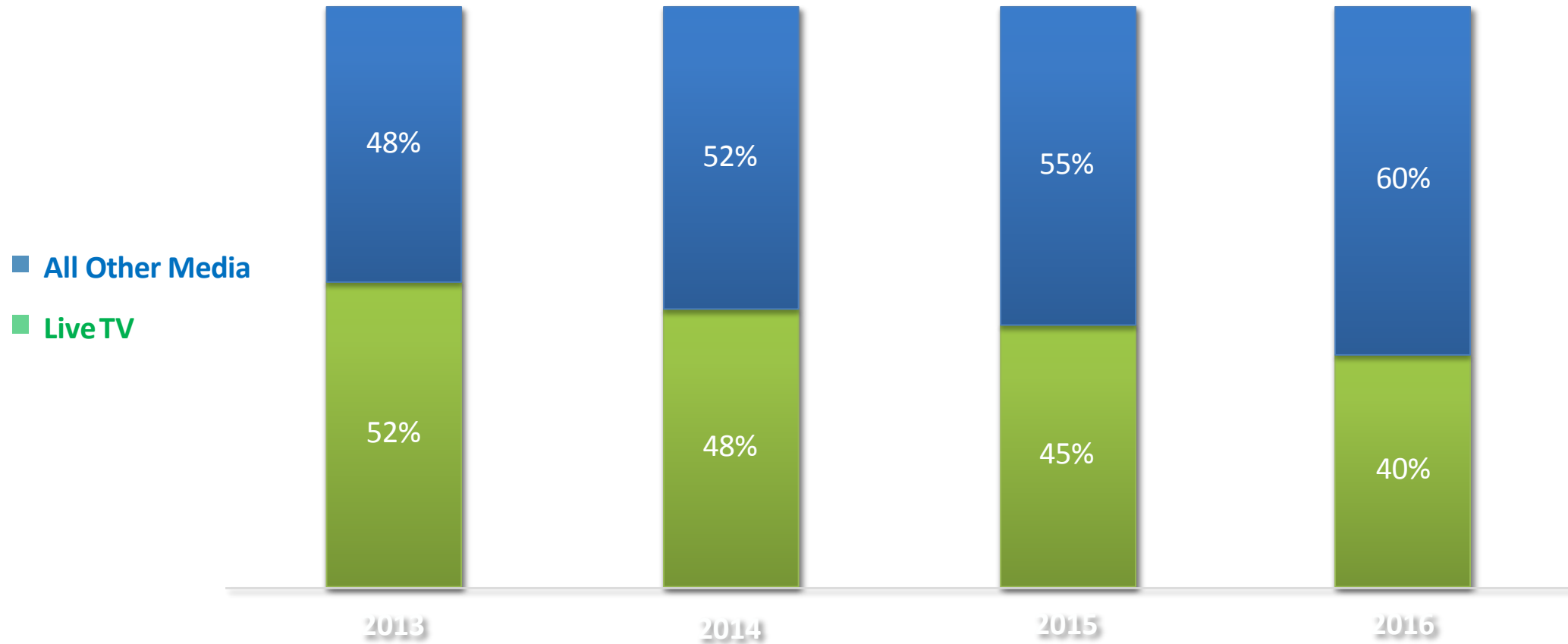
- Cyber security – Estaremos protegidos no mundo IP ?
- Inteligência artificial (AI), a chave para maior impacto e eficiência ?
- Fake news – como sabermos o que é real e preciso ?
- Mídias sociais e vídeo ao vivo
- A experiência do usuário – Fadiga tecnológica ?
- A geração vídeo game – há seriedade na era de fragmentação ?

Dados da *BI Intelligence*



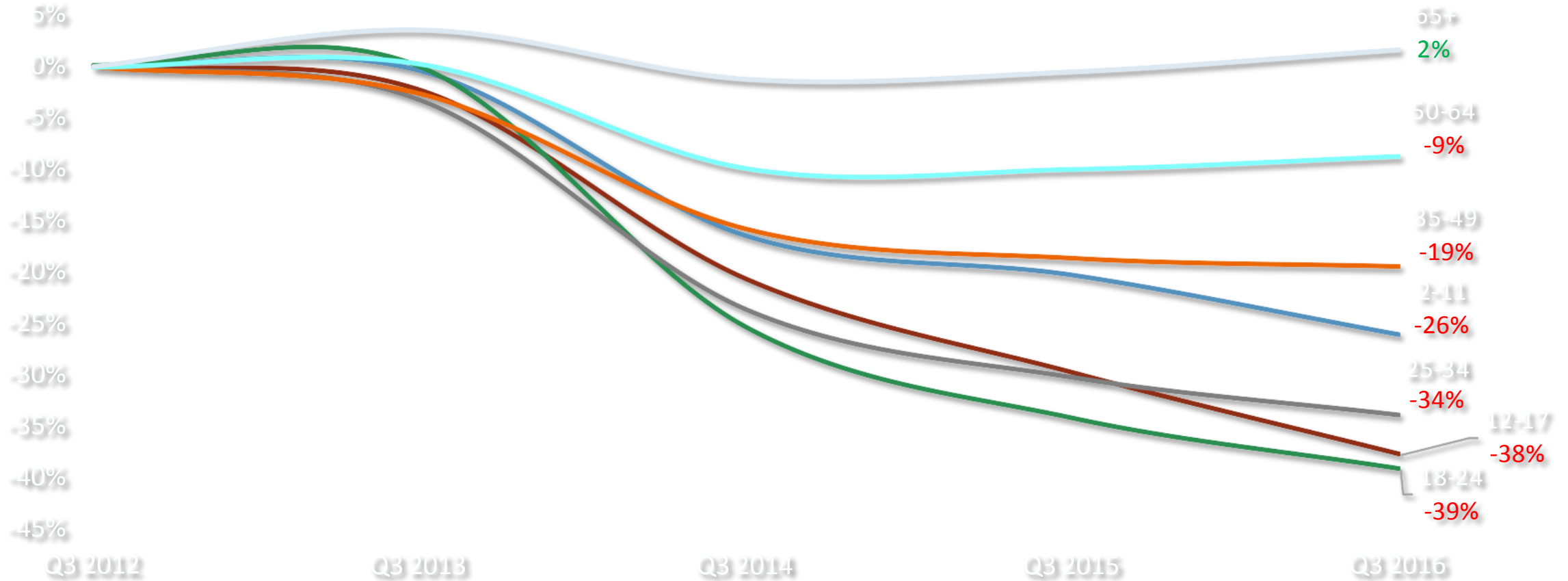
NEW MEDIA SOURCES CONTINUE TO GARNER A LARGER SHARE OF ATTENTION

Percentage of total media usage among us adults

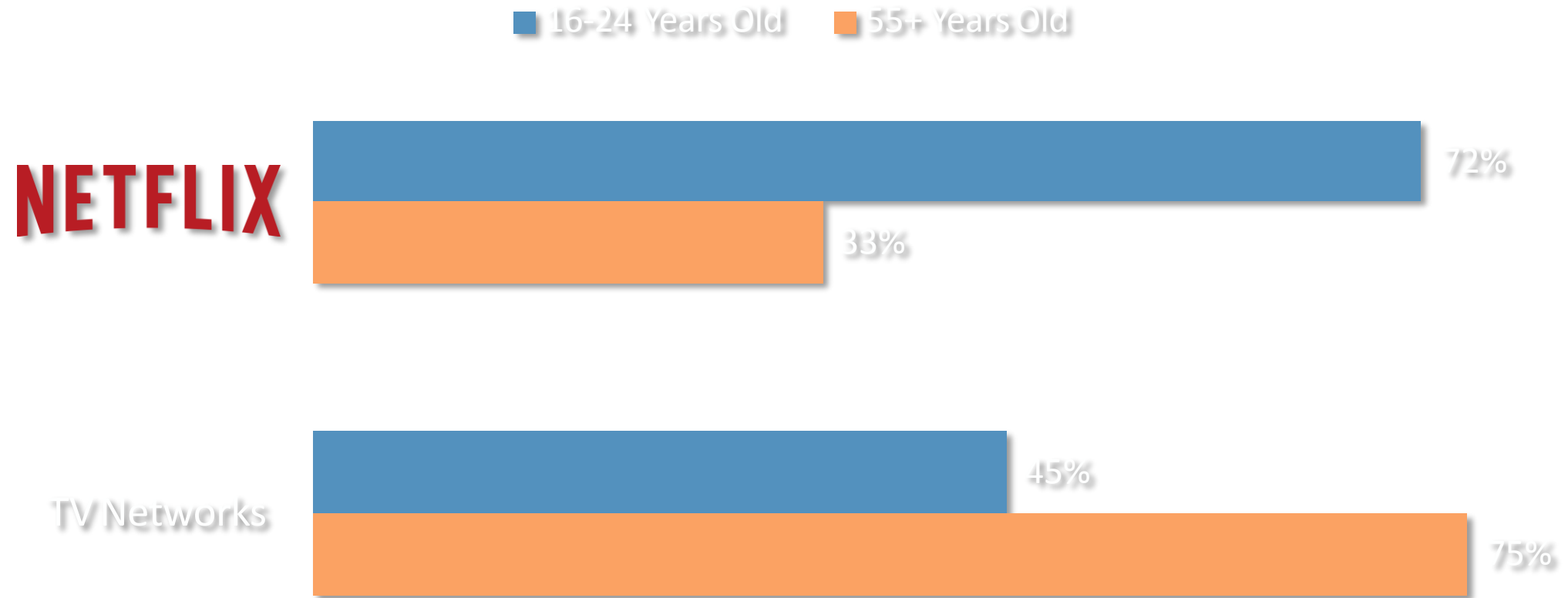


CONSUMERS OF ALMOST ALL AGE GROUPS ARE WATCHING LESS TRADITIONAL TV

Time spent watching traditional TV, by age group



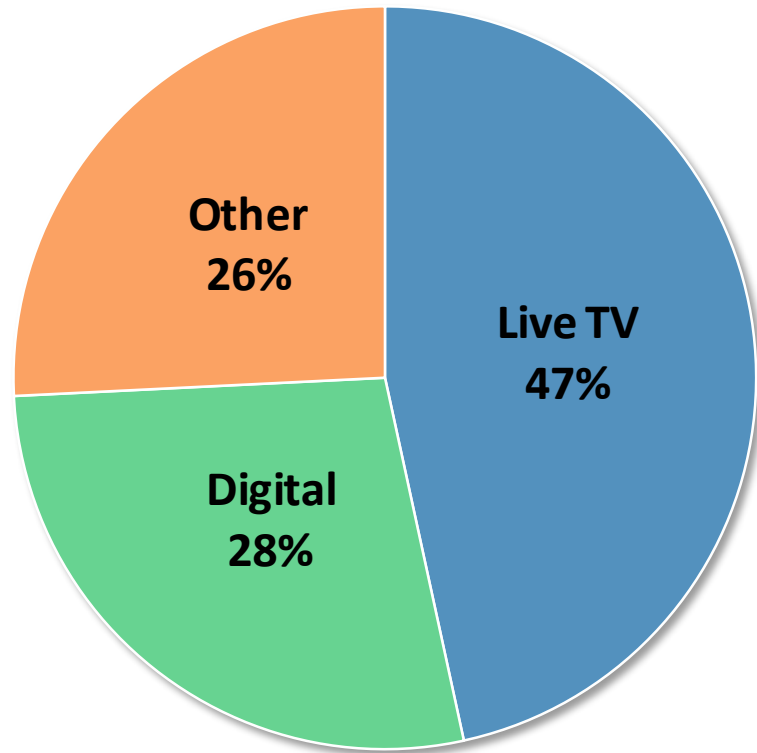
IT'S NO LONGER JUST TV NETWORKS



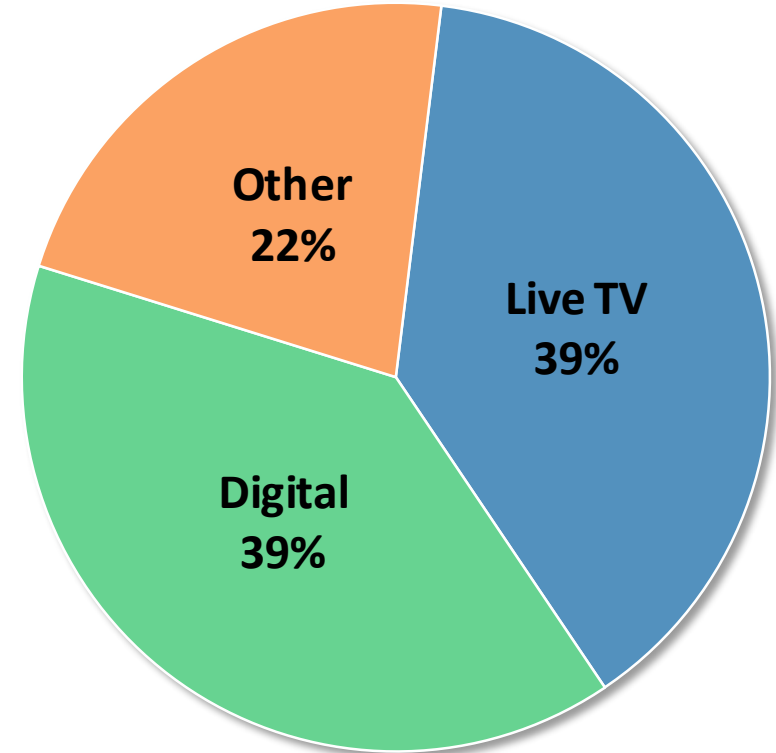
DIGITAL IS EATING AWAY AT LIVE TV

Share of media time spent per day per adult, by format (US)

Q3 2014

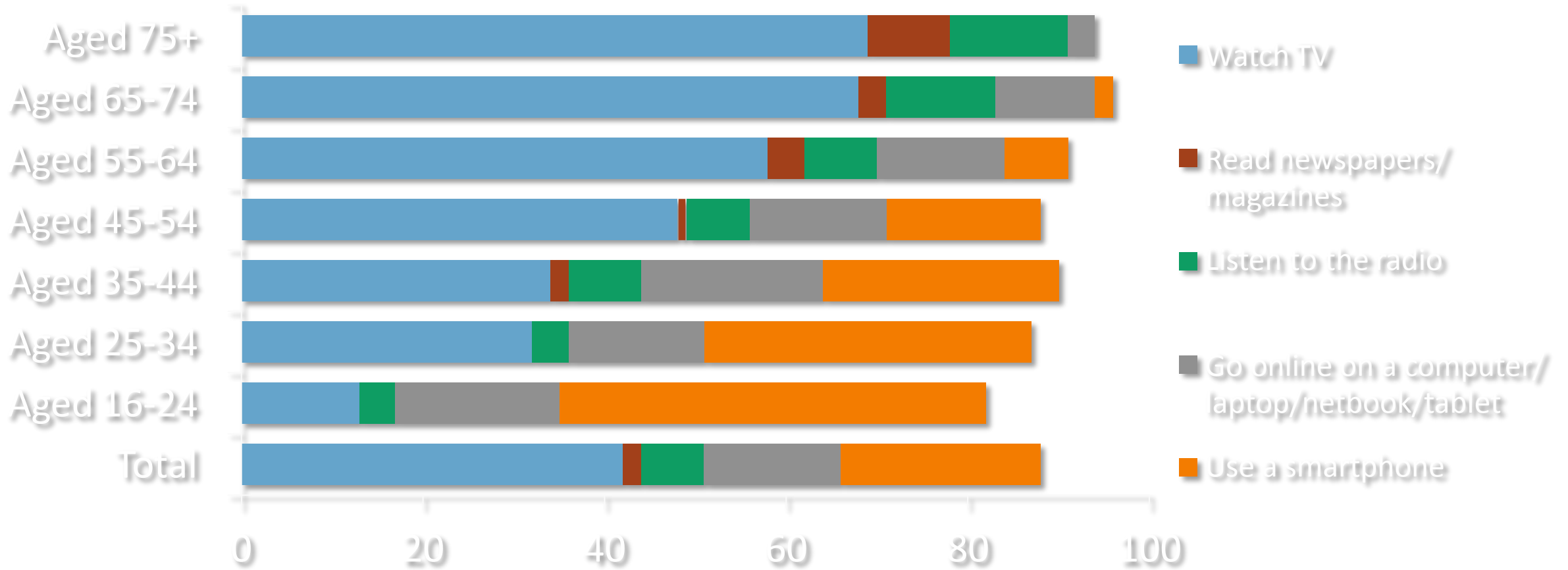


Q3 2016



THE SHIFT IS GENERATIONAL

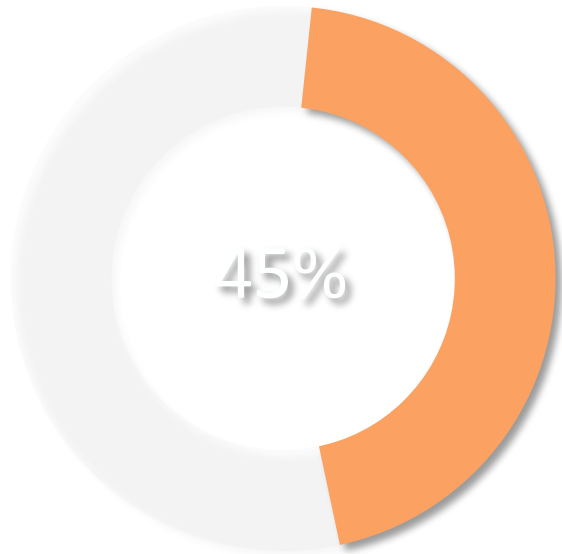
Top 5 Media Mentions Among All Adults, 2013



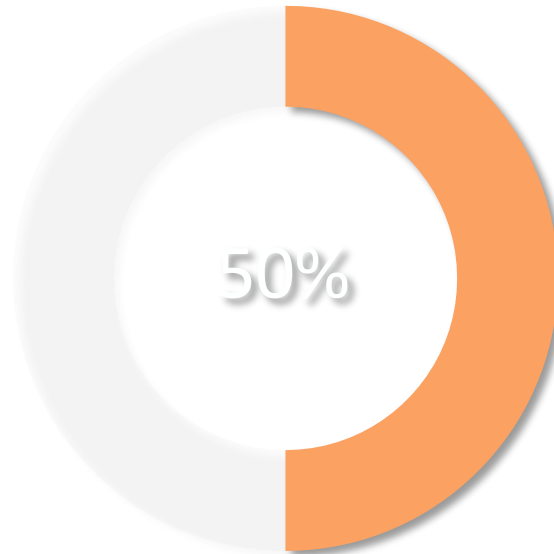
AND CONSUMERS ARE SPENDING MORE AND MORE TIME
WATCHING VIDEO ON THESE DEVICES

Percentage of mobile data traffic volume from video

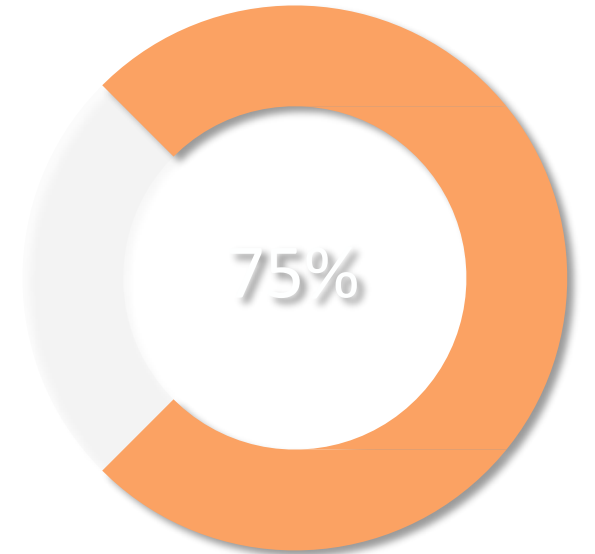
2014



2016

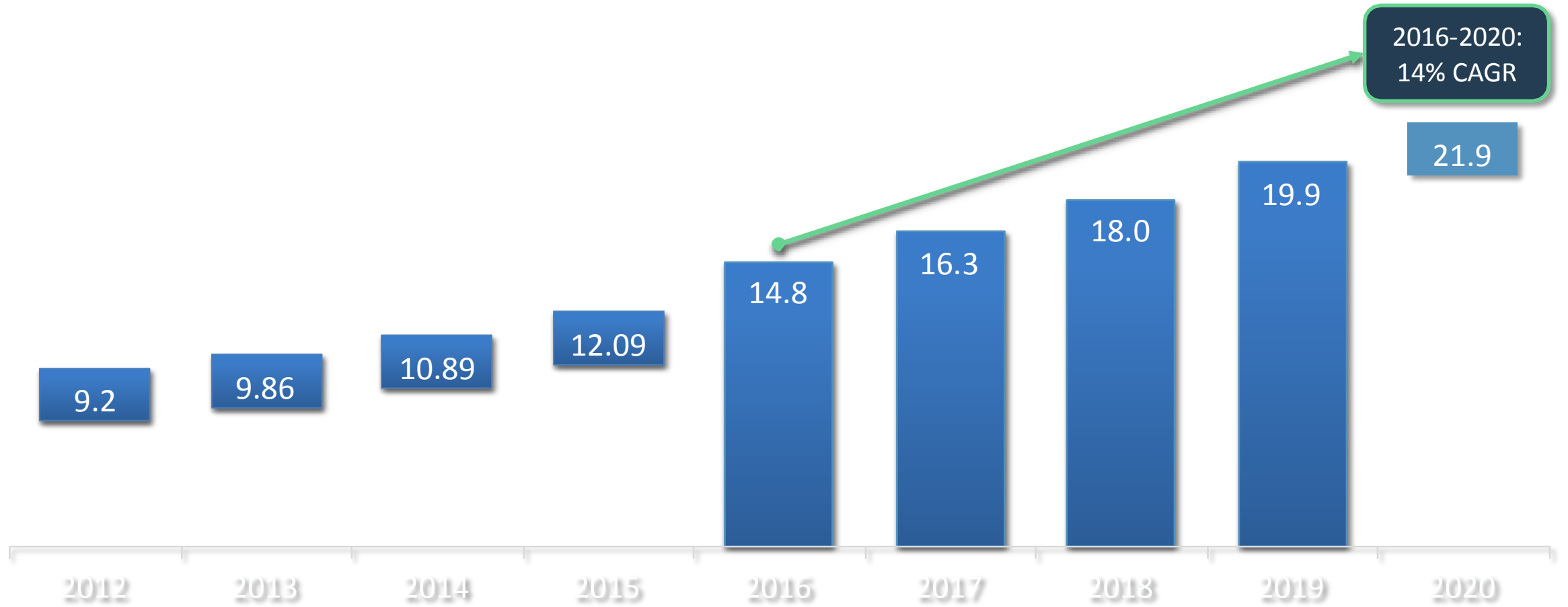


2022



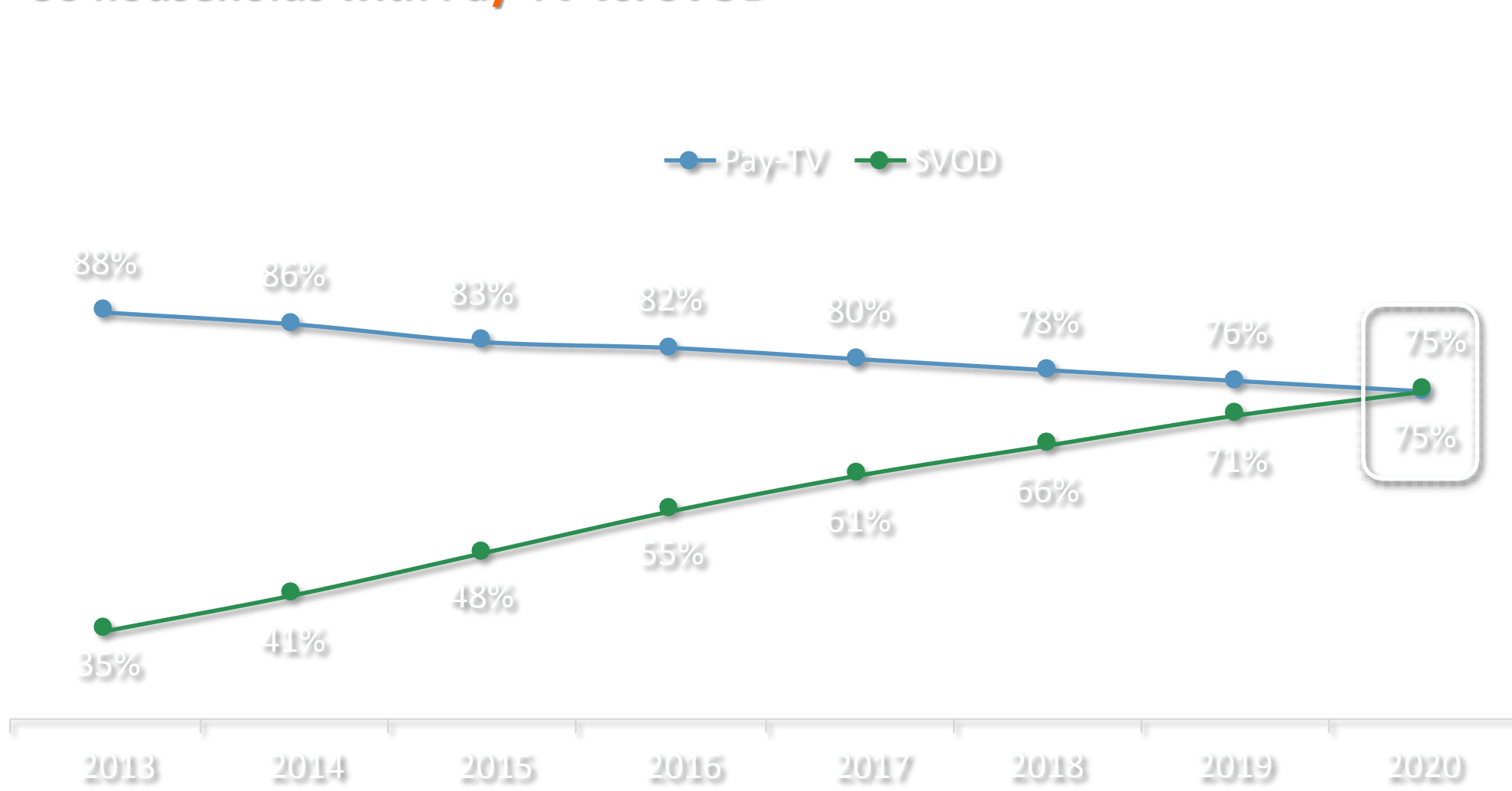
CREATING AN INCREASE IN BROADBAND-ONLY HOUSEHOLDS

Broadband - Only households in the US (millions)



SVOD IS CONTROLLING HOUSEHOLD PENETRATION GROWTH

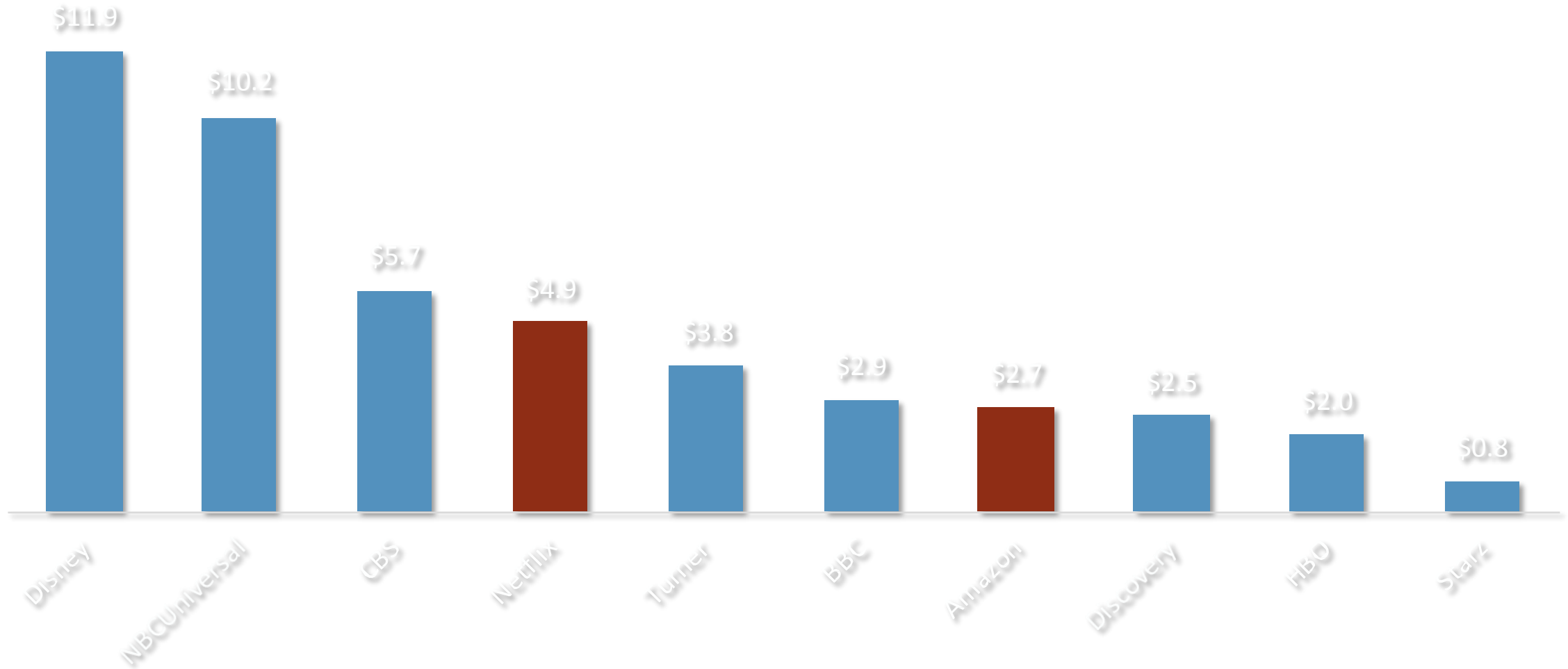
US households with Pay-TV vs. SVOD



If this trend continues, the same % of homes with Pay-TV will have access to an SVOD service by 2020

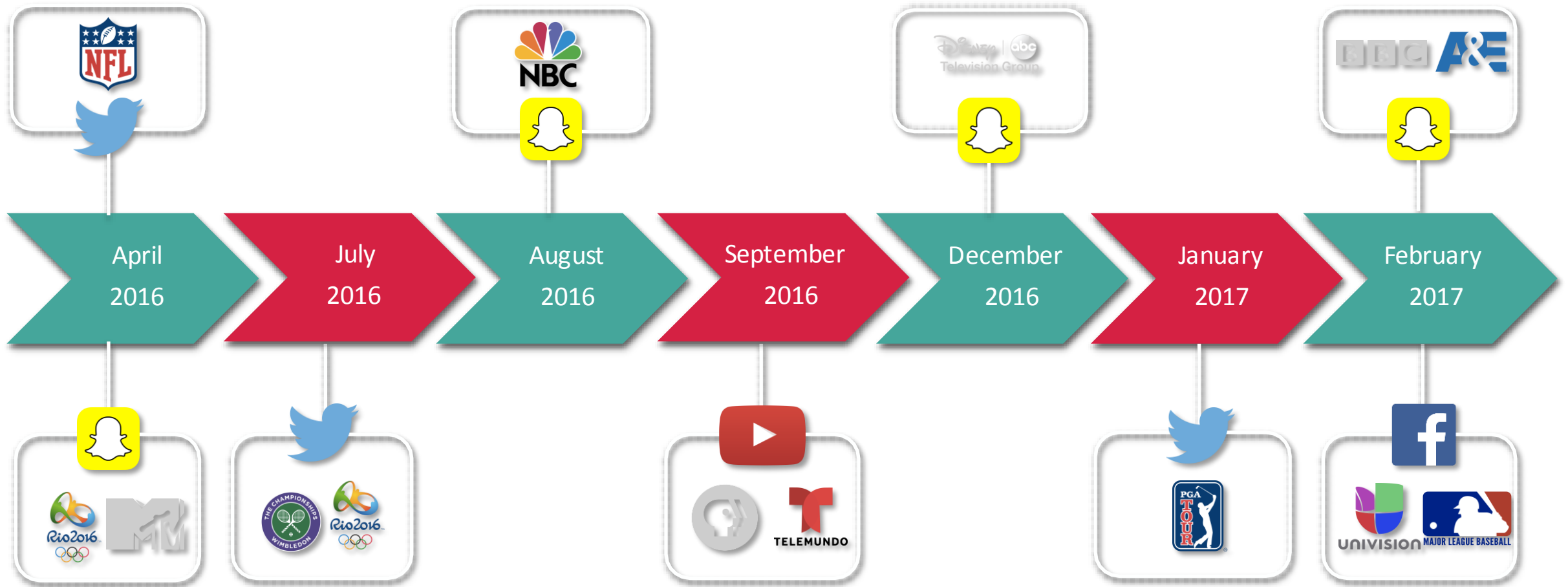
SVOD SPENDING IS RIGHT UP THERE WITH MAJOR TV NETWORKS

2015 Global programming spend (billions)



SOCIAL CHANNELS ARE LANDING MAJOR TV DEALS TO HOST VIDEO CONTENT ON THEIR PLATFORMS

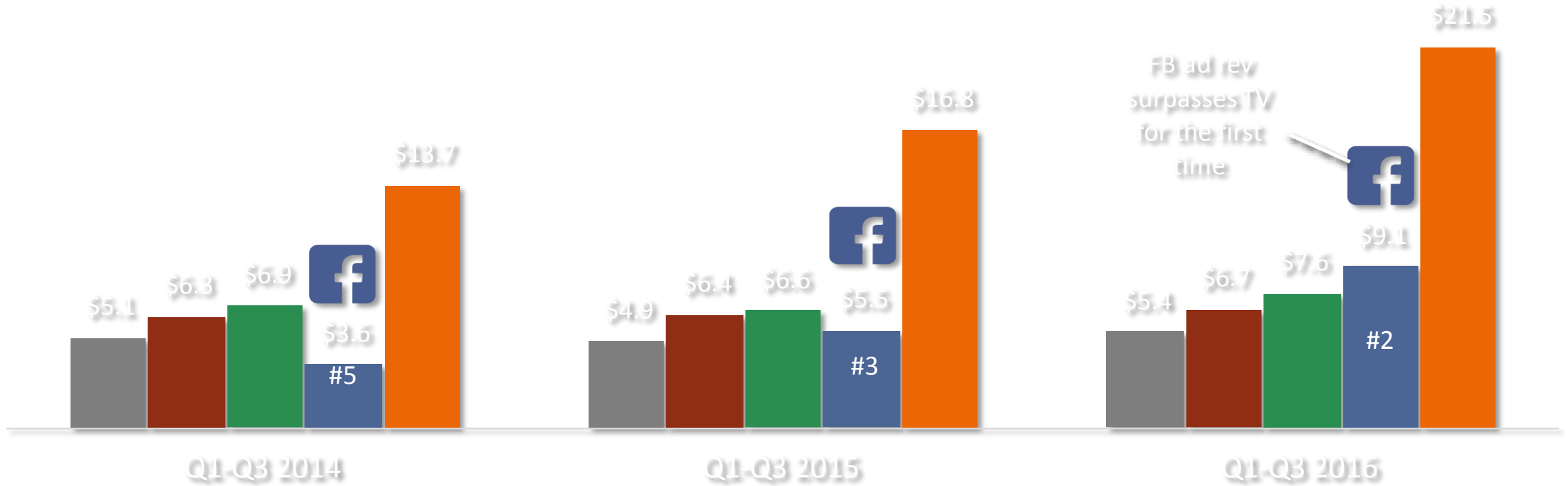
Recent social platform TV deals



AND HELPING TO DRIVE AD REVENUE FOR THESE PLATFORMS

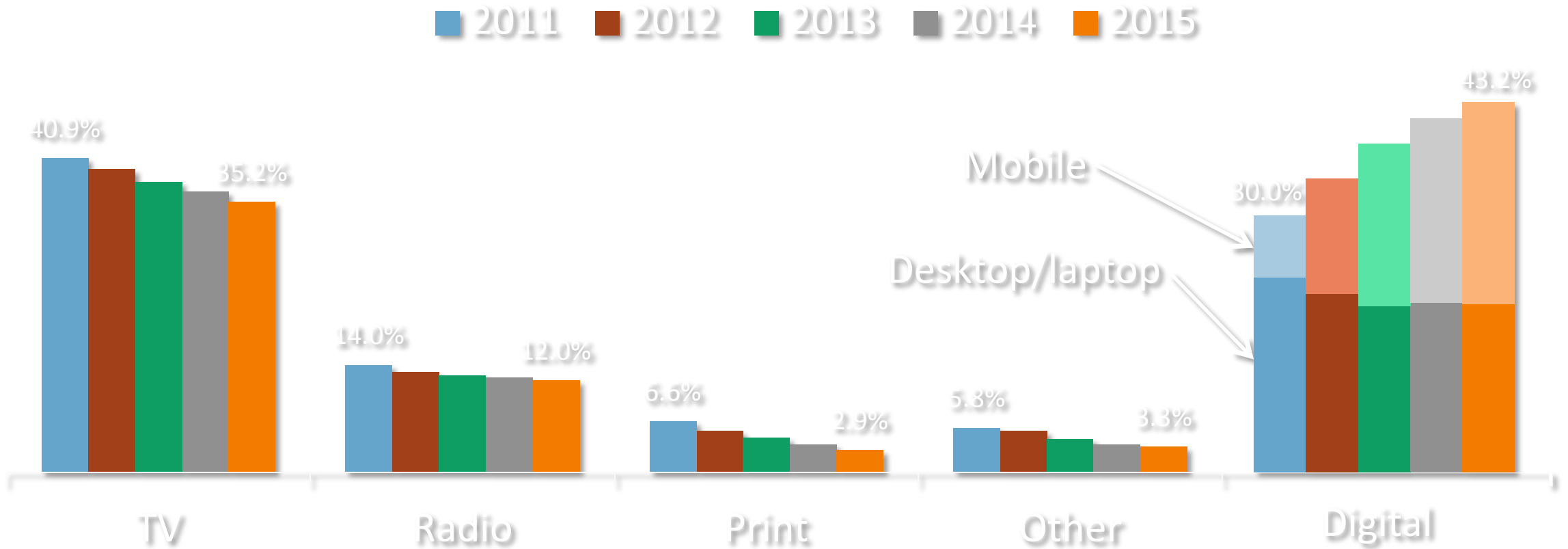
US Advertising revenue (billions)

■ CBS ■ Disney ■ Comcast ■ Facebook ■ Google



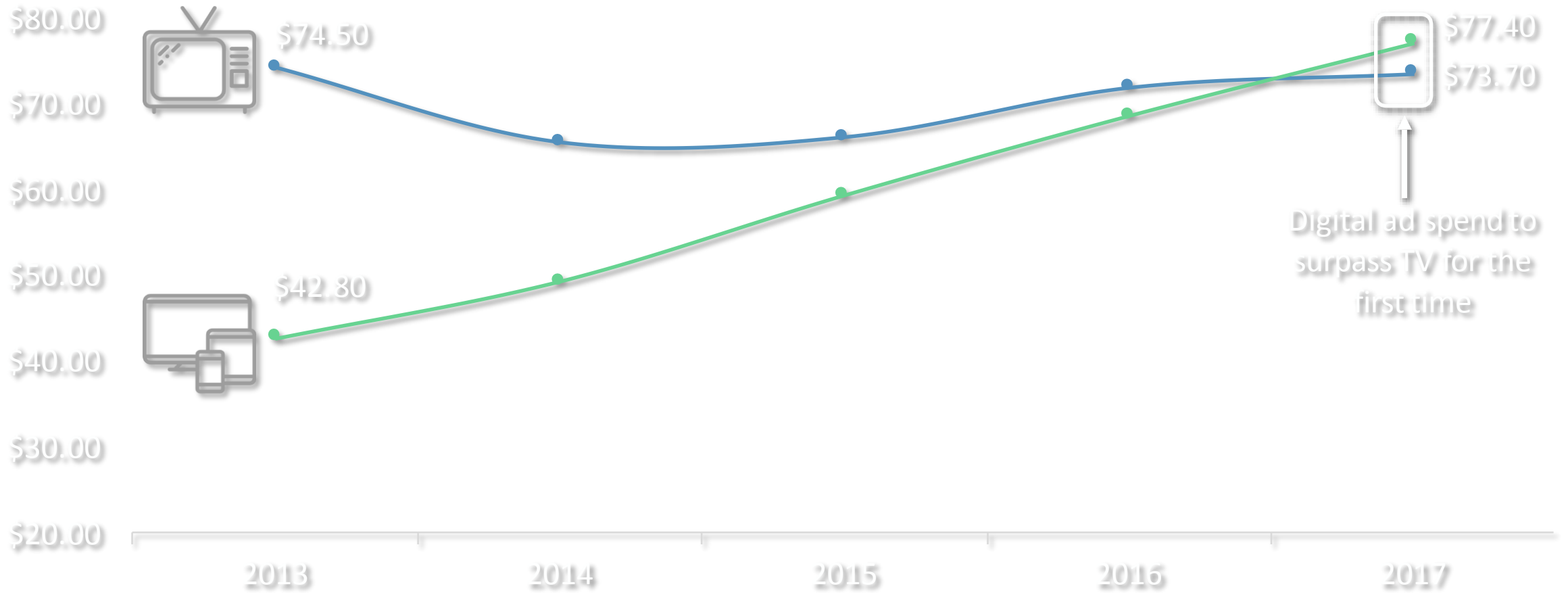
DIGITAL MEDIA CONSUMPTION IS GROWING,
EVERYTHING ELSE IS SHRINKING

US Consumer Media Consumption Share

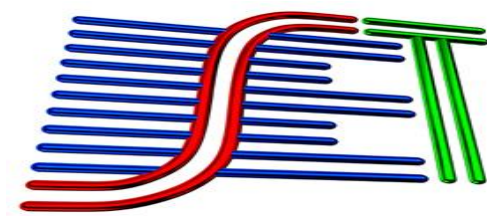


WHICH IS CAUSING A SHIFT IN HOW MARKETERS SPEND THEIR MONEY

US Digital vs. TV ad spend (billions)



O valor da TV



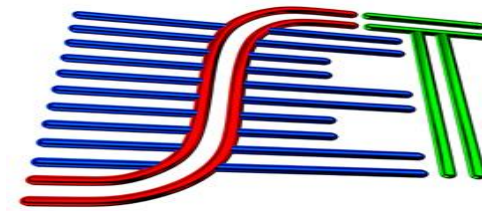
- Expectativas ainda otimistas
- Avanços tecnológicos
- Visão do negócio
- Mobilidade

**MODERN TV IS
EVERYWHERE, ANYTIME,
ON ANY PLATFORM**



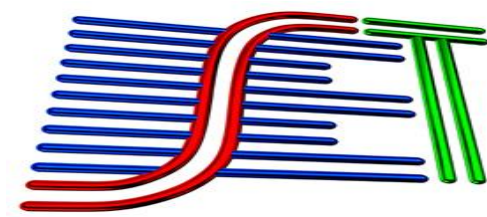
BI INTELLIGENCE

O que mais podemos esperar de avanços tecnológicos na tv



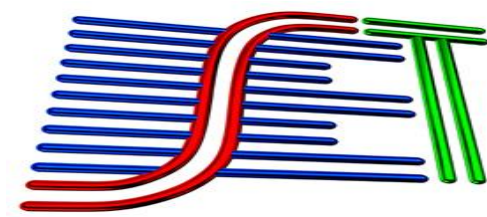
- Benefícios de transporte em IP
- A transmissão não é mais um silo independente
- Aproveitar a velocidade de evolução da Internet :Broadcast & Broadband como mecanismos de entrega .
- Permite novos tipos de serviços híbridos

Mobilidade

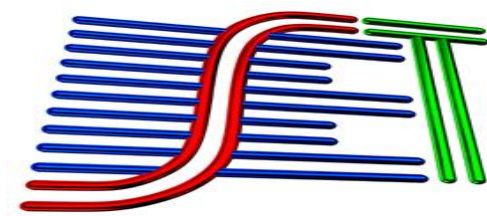


- Dispositivos móveis para todas as formas de comunicação
- As aplicações estão se movendo para a Nuvem
- O vídeo é o meio de comunicação natural
- A mídia está separada das plataformas de entrega
- Em qualquer hora, em todos os lugares, com acesso sem fio e na Nuvem

O que mais podemos esperar de avanços tecnológicos na tv

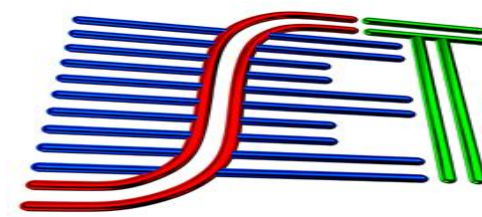


- Capacidade de incorporar perfeitamente conteúdo de nicho
- Habilitar novos modelos comerciais
- Inserção Localizada
- Anúncios ou outros conteúdos
- Permite o modelo de receita para os organismos de radiodifusão disponíveis para operadores de TV a cabo ou IPTV

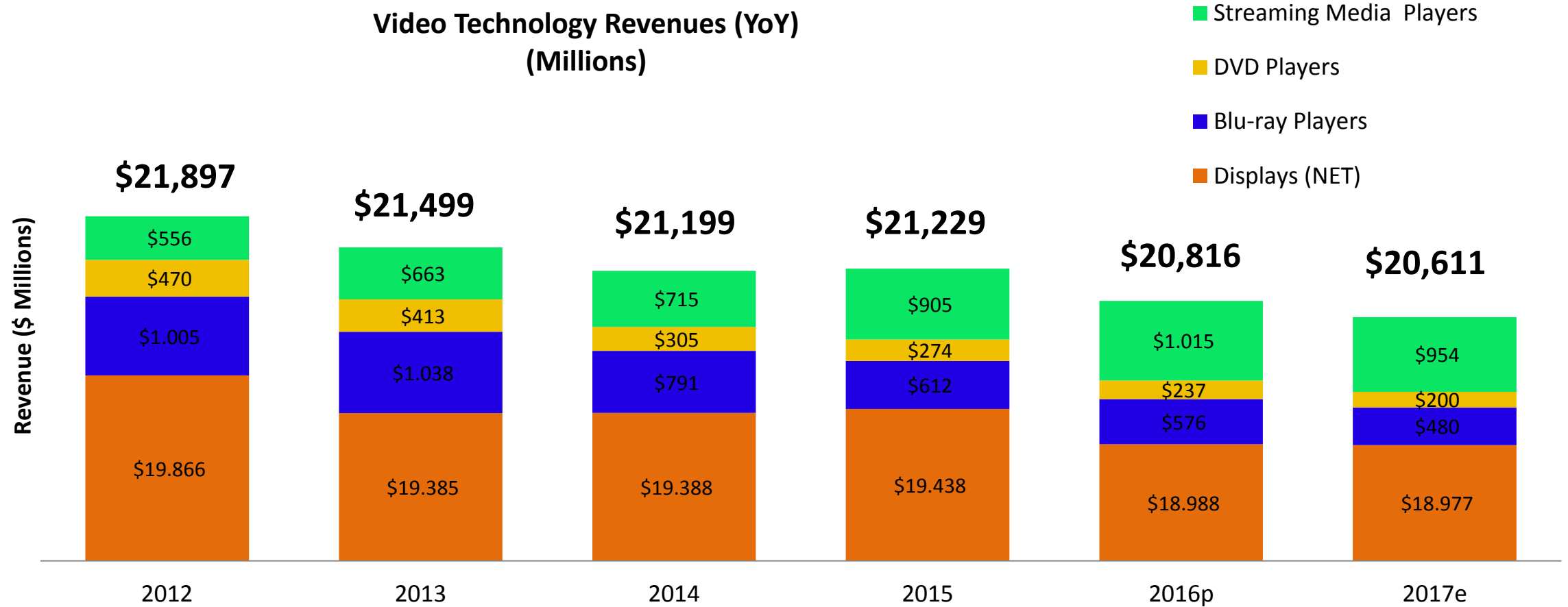


- **Futuro do televisor da sala ?**
- **O que os dispositivos móveis causam nos hábitos de consumir média ?**

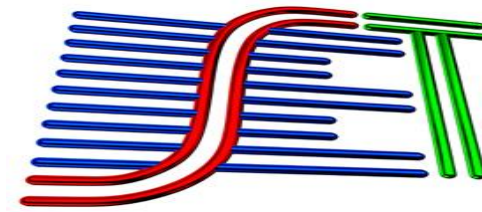
Displays Continue to Carry the Video Market



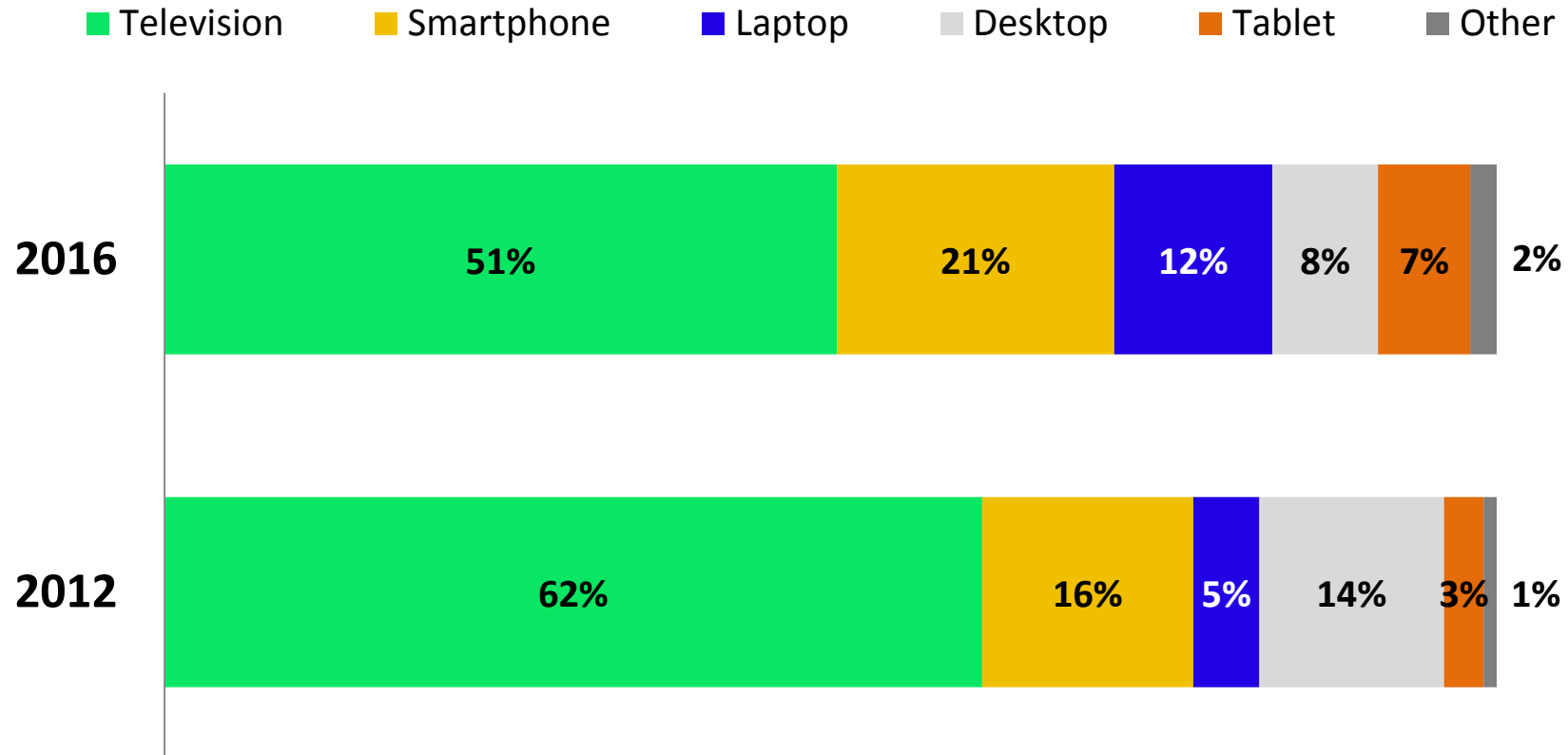
Despite video consumption growing on mobile devices and computing products such as smartphones and laptops, the desire for displays still remains, especially as more displays incorporate streaming capabilities and consumers' video consumption behavior continues to shift away from physical media.



Smaller Screens Have Bigger Viewing Share



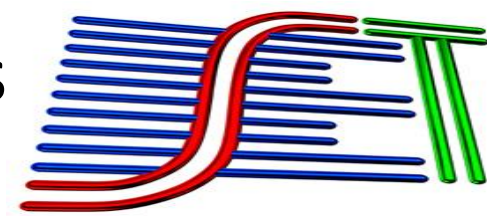
Average Share of Video Viewing on Each Device



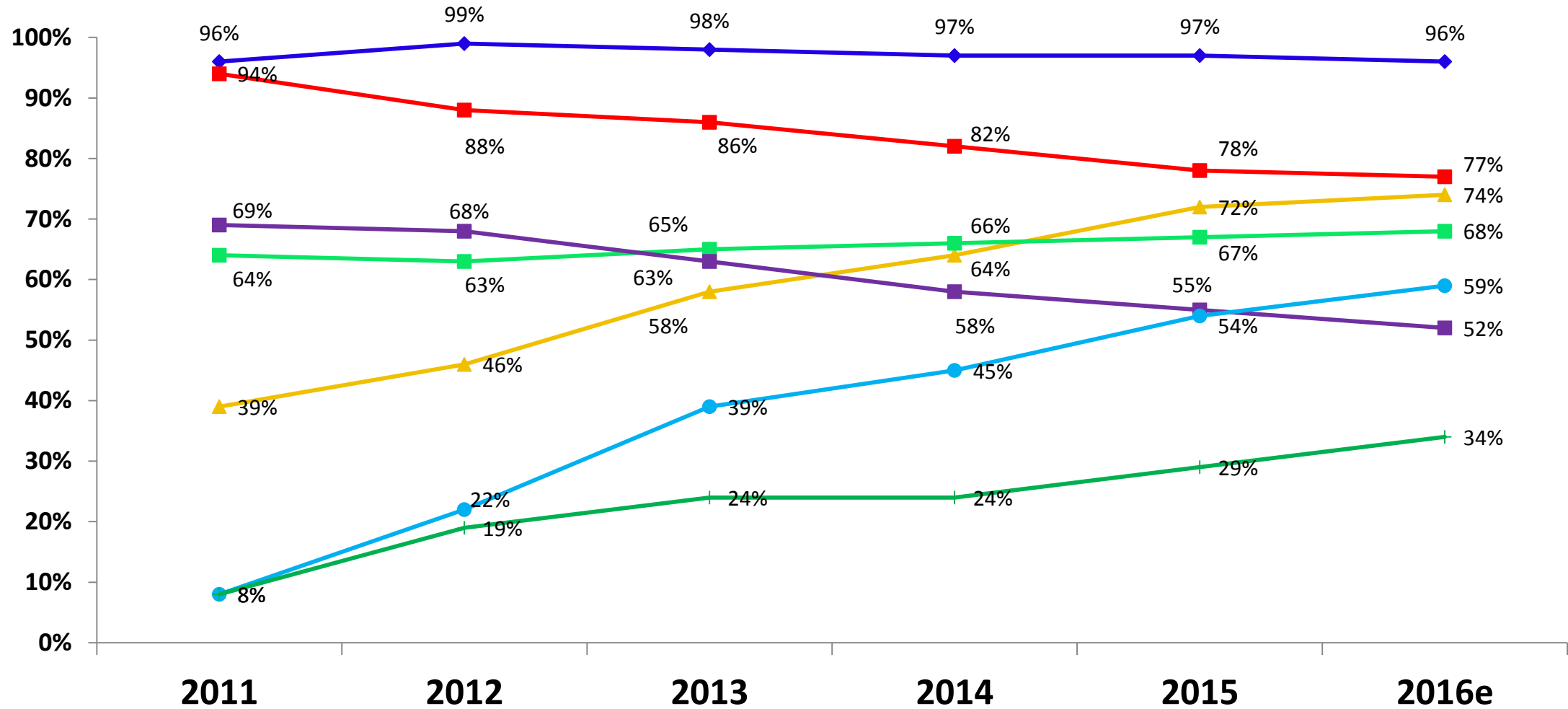
Source: The Evolving Video Landscape (2012)

Source: 2016 Video Study Q3. What percent of your video watching is done on the following devices? Base: Online U.S. Adults (n=1,000)

U.S. Household Penetration of Video Devices

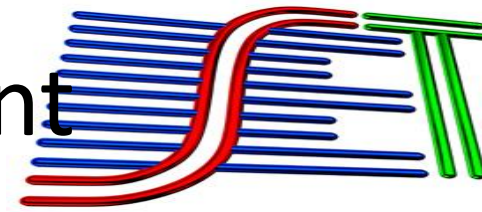


◆ TV (NET) ■ DVD/Blu-ray Player ▲ Smartphone ■ Laptop ■ Desktop ● Tablet + Streaming Device



Source:
18th Annual Consumer Technology Ownership and Market Potential (2016)

Increase in Time Spent Viewing Content



Hours spent watching per week

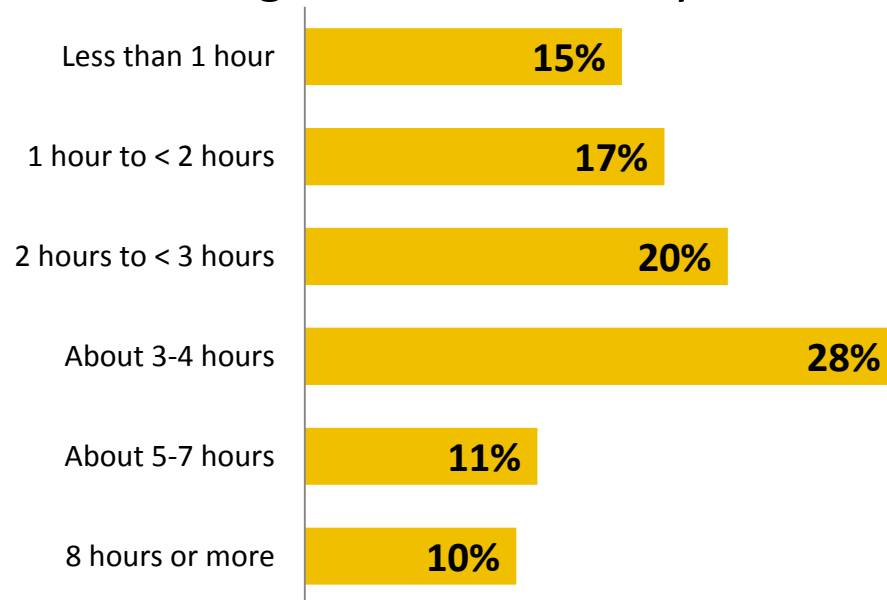


2016: 16.8
2011: 12.7*



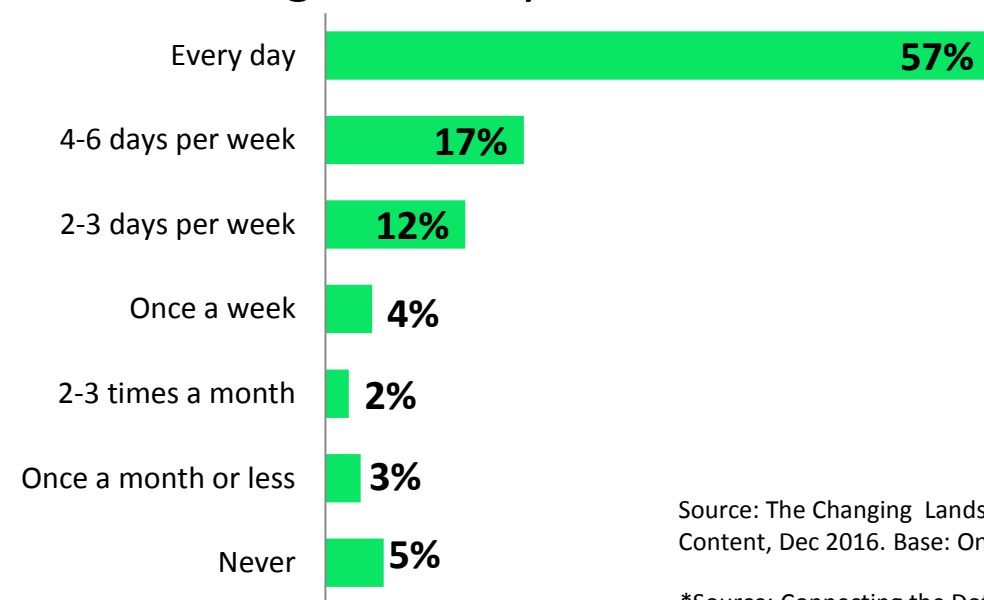
Hours Watched Per Day

Average: 3.2 hours a day



Frequency of Watching

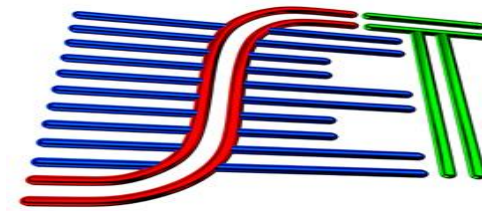
Average: 5.2 days a week



Source: The Changing Landscape of Video and Content, Dec 2016. Base: Online U.S. adults (n=1000)

*Source: Connecting the Dots Between Consumers, Content and Consumer Electronics in the Home (2011);

Key Findings



How long do they watch?

US consumers spend 16.8 hours watching video content per week

- diversified content sources, varied devices

What devices do they watch on?

On average, 51% of video viewing is done on a television

- **Device Preferences**

- Most US consumers prefer the big screen of the TV
- Customers who pay for streaming services use more portable devices...
- ...for accessibility, convenience and speed of accessing content.

- **Planned Purchases**

- Nearly 2/3 plan to purchase a device for video viewing within the next 12 months
- Top devices planned for purchase are smartphones and TVs.
- Reasons include: larger screens, latest models, and smart devices for quick access.

What content do they receive?

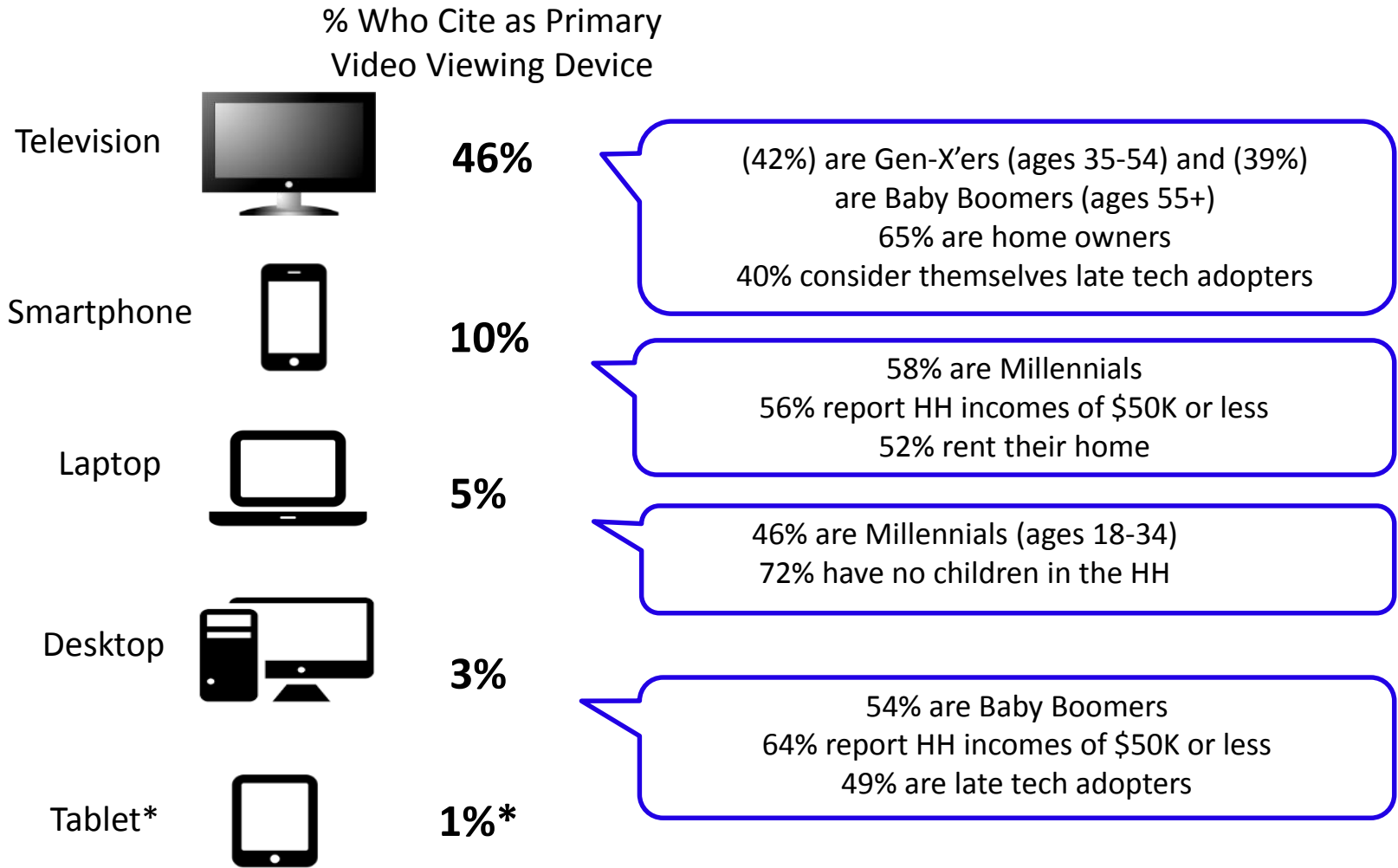
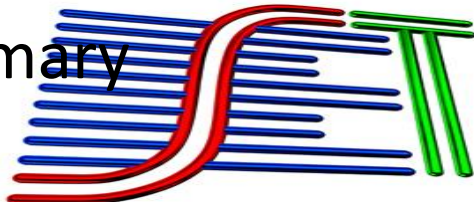
67% of US consumer receive pay-TV content

- Pros: Variety of content
- Cons: Rising prices (paid)

68% (and growing) are taking streaming content (paid or unpaid)

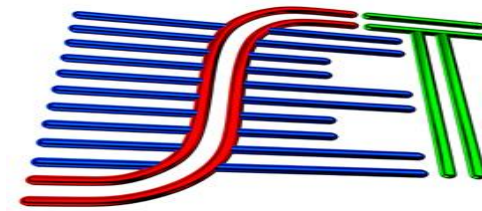
- Pros: Price and accessibility
- Cons: Limited content especially latest movies, cable TV shows; problems with connectivity

Demographics of Consumers Who Cite Device as Their Primary Video Viewing Device

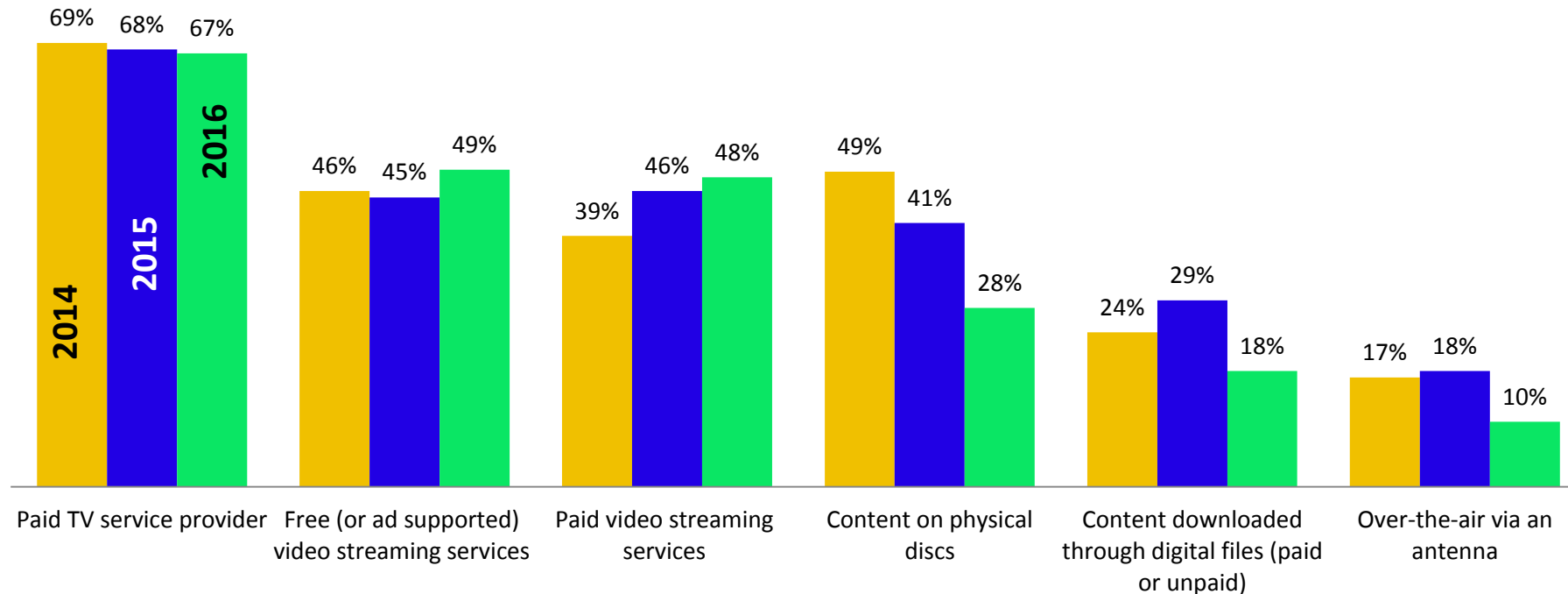


*segment too small to report demographic differences (n=10)
Q3. What percent of your video watching is done on the following devices? Base: Online U.S. adults (n=1000)

How Content is Received



While the amount of consumers receiving pay TV content has remained stagnant over the past two years, the amount of consumers receiving streaming content continues to rise (**68% in 2016** compared to 63% in 2014). The number of consumers accessing content through DVDs has declined by nearly half over the past two years, though it still represents a sizable segment of the population (28%).

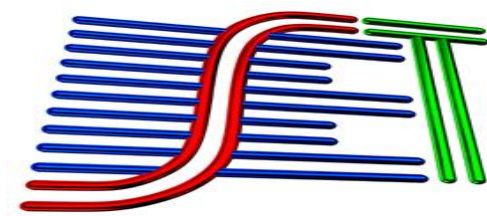


Paid TV Service Provider ONLY: 20%

Paid Video Streaming ONLY: 4%

Video Streaming ONLY: 14%

Q4. Thinking about all the devices you use to watch video content (such as televisions, smartphones, tablets or computers), how do you currently receive the video content you watch on those devices? Base: Online U.S. adults (n=1,000)



Muito obrigado !

ojfranco@set.org.br