



Forecasts of Online Video and Gigabit Access

Lawrence Vanston, Ph.D.
President,
Technology Futures, Inc.

lvanson@tfi.com

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13740 Research Blvd., Bldg. C-1 • Austin, Texas 78750
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Industry Broadband Forecasts

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Broadband Generations, Data Rate Categories*

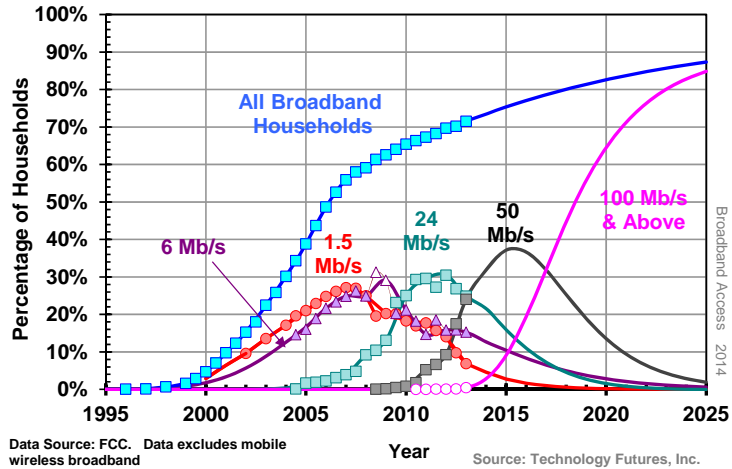
Nominal	Range	
1.5 Mb/s	Less than 3 Mb/s	
6 Mb/s	At least 3 Mb/s and less than 10 Mb/s	
24 Mb/s	At least 10 Mb/s and less than 25 Mb/s	} VHS Broadband
50 Mb/s	At least 25 Mb/s and less than 100 Mb/s	
100 Mb/s	At least 100 Mb/s and less than 300 Mb/s	
300 Mb/s	At least 300 Mb/s (Includes 1 Gb/s)	

*These are based on downstream, but upstream is becoming important also.

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Broadband Households by Nominal Data Rate



Data Source: FCC. Data excludes mobile wireless broadband

Source: Technology Futures, Inc.

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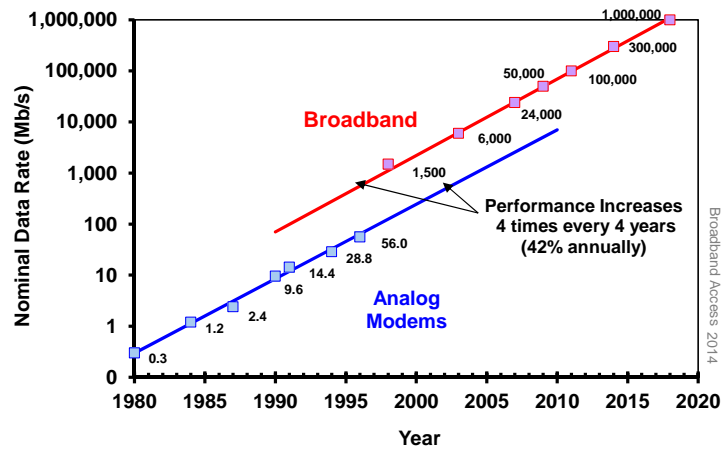
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Adding Another Generation

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Trend in Residential Access Data Rates



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Constant Percentage Rate of Advance

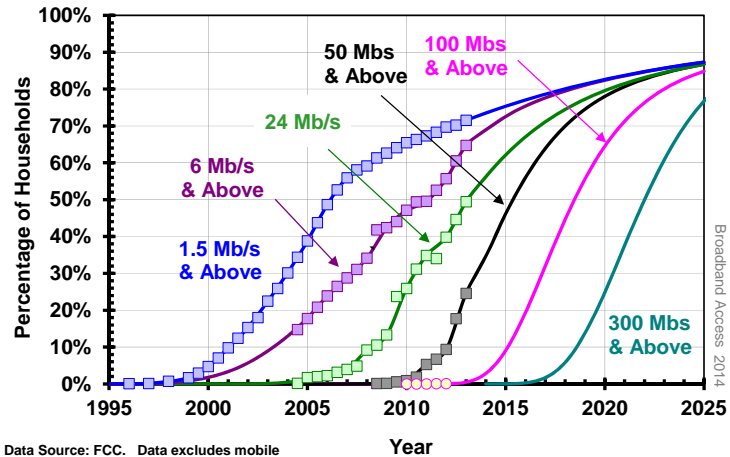
- Most new technologies progress this way
- Rates will continue if:
 - The improvement is technically possible
 - Basic approach remains the same
 - Demand, utility, need continue

From TFI's Technology Forecasting Seminar

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Broadband Households by Nominal Data Rate



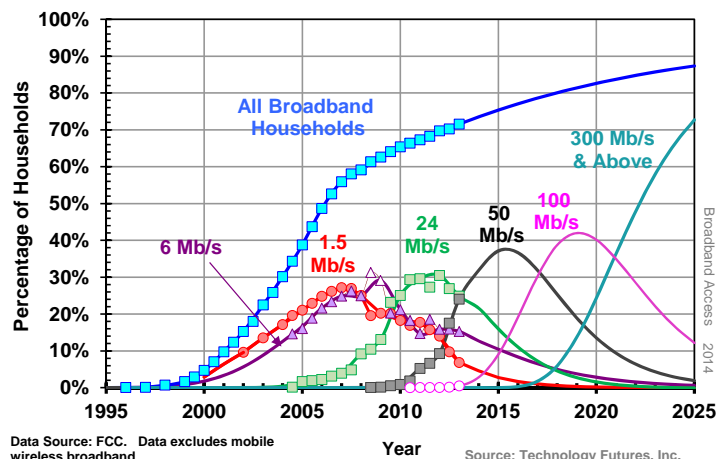
Data Source: FCC. Data excludes mobile wireless broadband

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U.S. Broadband Lifecycles (Residential Subscribers)



Data Source: FCC. Data excludes mobile wireless broadband

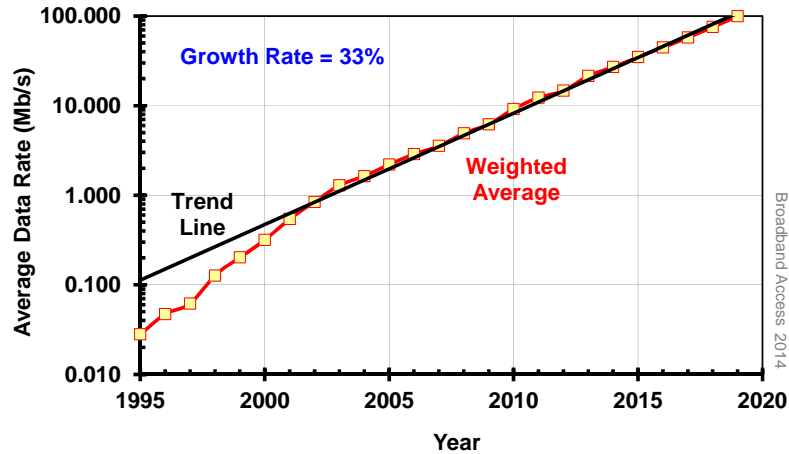
Source: Technology Futures, Inc.

Lifecycle (t) =
Substitution (t) – Next Substitution (t)

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Resulting Average Data Rate



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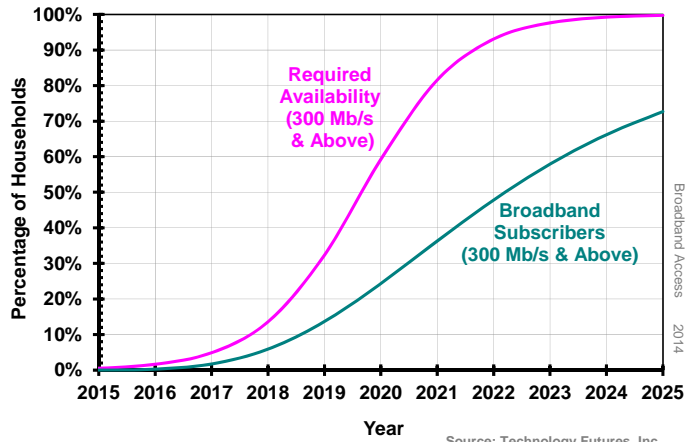
Caveat: The generations reflect historic trends in nominal bandwidth demand. Market forces may accelerate these without a corresponding acceleration in actual bandwidth requirements.

Example: 300 Mb/s & Above may include a lot of “pre-mature” Gigabit!

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Availability vs Subscribers, 300 Mb/s & Above - Updated



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Online Video Forecasts

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Internet Video – Peak Period Traffic – North America, Fixed Access

Rank	Upstream		Downstream		Aggregate	
	Application	Share	Application	Share	Application	Share
1	BitTorrent	25.49%	Netflix	34.89%	Netflix	32.39%
2	Netflix	9.48%	YouTube	14.04%	YouTube	13.25%
3	HTTP	7.18%	HTTP	8.62%	HTTP	8.47%
4	SSL	7.05%	Facebook	2.98%	BitTorrent	5.03%
5	YouTube	6.14%	BitTorrent	2.80%	Facebook	2.94%
6	iCloud	4.41%	iTunes	2.77%	SSL	2.63%
7	Skype	2.77%	MPEG - OTHER	2.66%	iTunes	2.55%
8	Facebook	2.60%	Amazon Video	2.58%	MPEG - OTHER	2.44%
9	FaceTime	2.38%	SSL	2.14%	Amazon Video	2.37%
10	Dropbox	1.48%	Hulu	1.41%	Hulu	1.20%
		68.98%		74.89%		73.28%

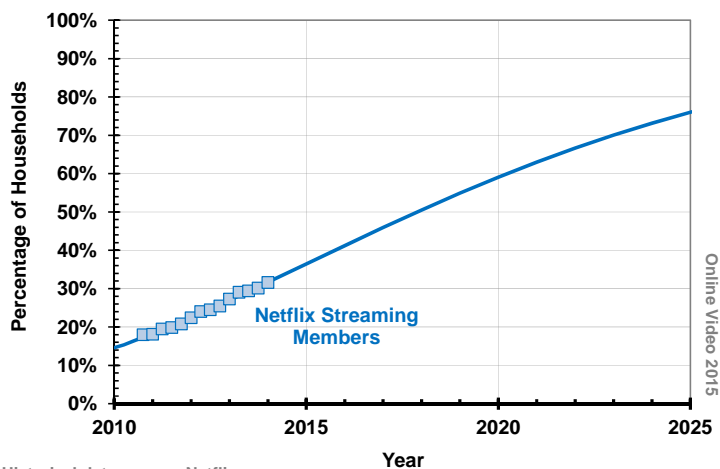


Table 2 - Top 10 Peak Period Applications - North America, Fixed Access

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Netflix Streaming Members, Domestic



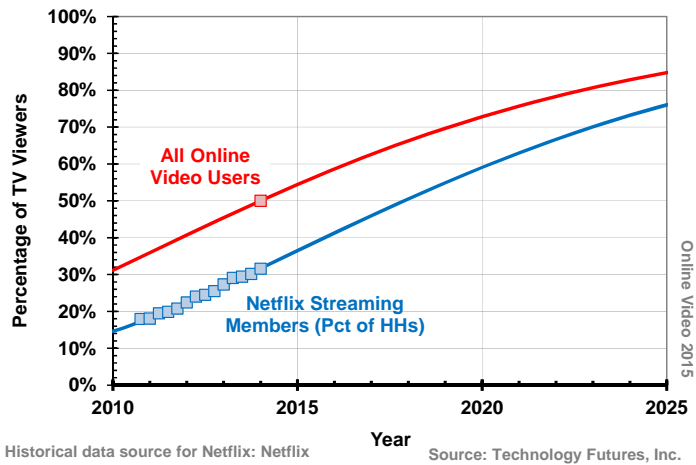
Historical data source: Netflix

Source: Technology Futures, Inc.

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Online Video Users



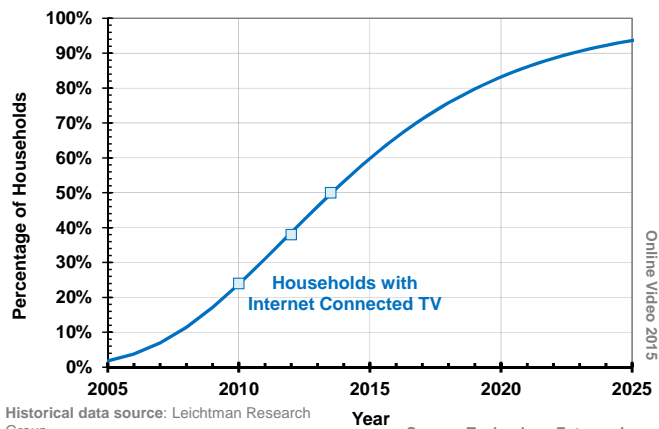
Historical data source for Netflix: Netflix

Source: Technology Futures, Inc.

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Households with Internet Connected TVs



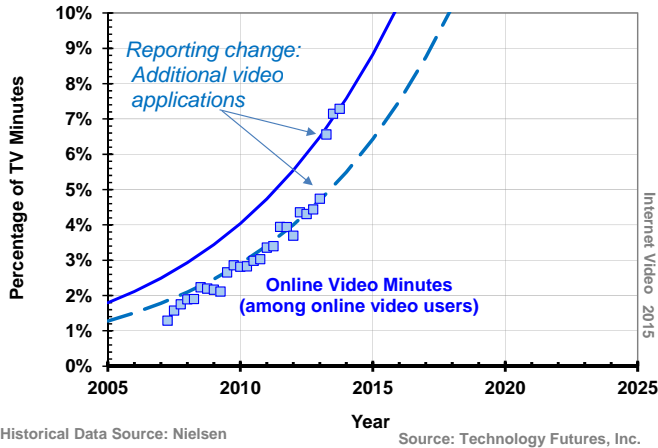
Historical data source: Leichtman Research Group

Source: Technology Futures, Inc.

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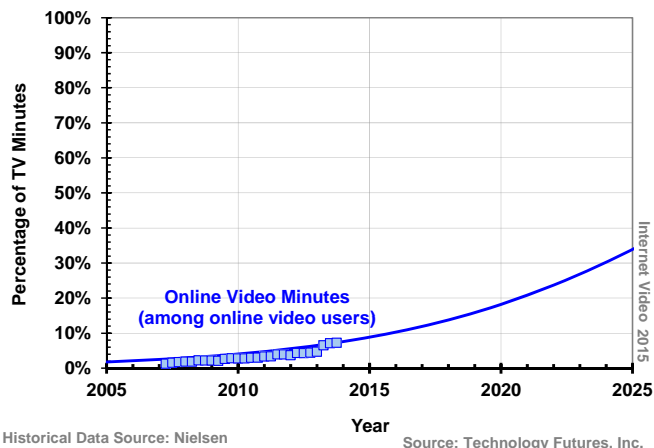
Online Video Minutes, Percent of Total TV Viewing (Scale to 10%)



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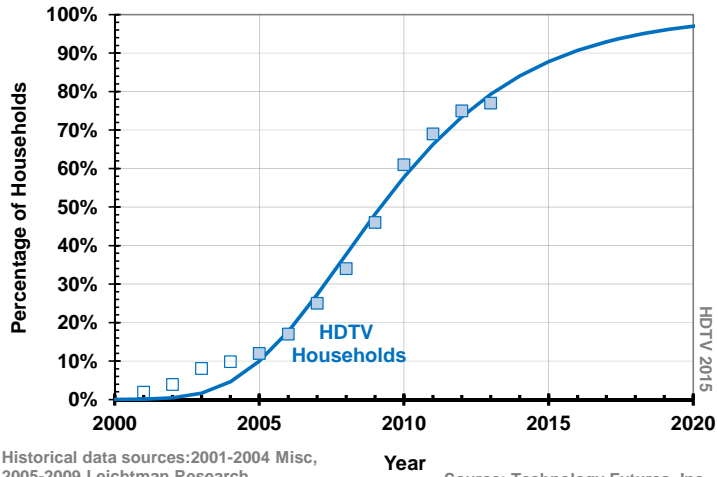
Online Video Minutes, Percent of Total TV Viewing (Full Scale)



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HDTV Households



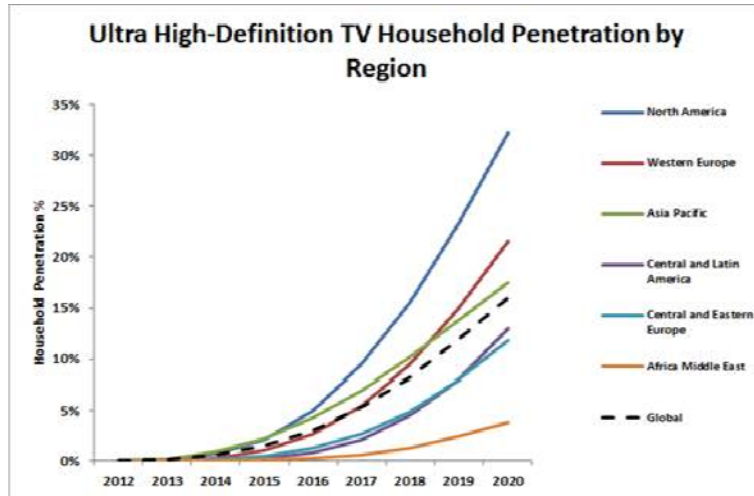
Historical data sources: 2001-2004 Misc, 2005-2009 Leichtman Research

Source: Technology Futures, Inc.

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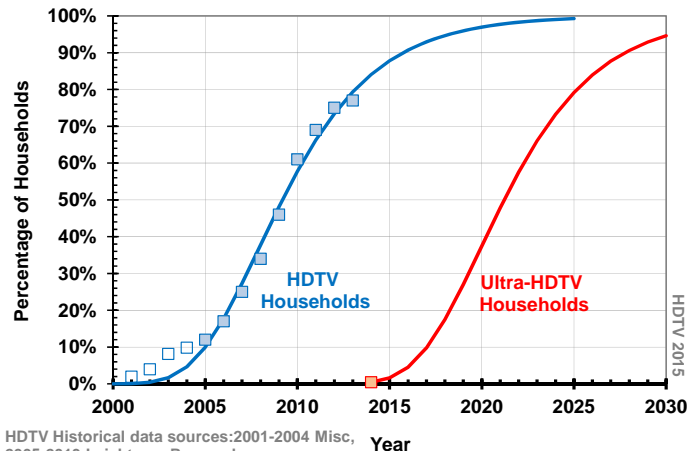
Ultra-HD Households (aka 4K)



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Ultra-HD Households (aka 4K)



Source: Strategy Analytics

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