

# How Much Information? 2003

## Summary

Exec Summary

## Stored Information

Paper | Film | Magnetic | Optical

## Information Flows

Broadcast | Telephony | Internet

## Wrap-up

Thanks | Printable (PDF)

## Broadcast

### I. Radio

[A. Conversion Factor](#)

[B. World](#)

[C. United States](#)

[D. European Union](#)

[E. Online Radio](#)

### II. Television

[A. Conversion Factor](#)

[B. World](#)

[C. United States](#)

[D. European Union](#)

[E. Consumption](#)

[F. Stock](#)

### III. Interesting Facts

[References](#)

[Printable Section \(PDF\)](#)

[Charts \(Excel\)](#)

## 6. BROADCAST MEDIA

In this section, we focus on the two broadcast media: radio and television.

Worldwide the number of hours of original programming for both radio and TV has not changed significantly since our 2000 study. Due to difficulties in data collection for this statistic our degree of confidence in this finding is low.

In the United States, there has been a 5% increase in the number of radio stations and a 6% increase in the

number of television stations. However, due to increased syndication of content and higher percentages of advertising, these increases may not mean that more original items are being produced.

Satellite radio has emerged as a new category since our 2000 study; this format has yet to achieve wide popularity. Legal challenges have impeded the growth of online radio stations, which had seemed poised to expand in 2000. Personal video recorders such as TiVo and Replay have also not yet received the widespread consumer acceptance that analysts had predicted.

**Table 6.1: World – annual production of original broadcast media items – 2003 sources**

Media Type	Number of Stations	Unique Items per Year	Conversion Factor	Total Terabytes (Annual)	
				Lower Bound	Upper Bound
Radio	47,776	70 million hours of original programming	0.05 GB/hour	3,488	3,488
Television	21,264	31 million hours of original programming	1.3 GB - 2.25 GB hour	39,841	68,955
<b>Total:</b>				<b>43,329</b>	<b>72,443</b>

Source: Raw data from CIA World Factbook, 2002. Table, How much information 2003.

**Table 6.2: World – Comparison of production of original broadcast media items – 2000 sources vs. 2003 sources**

Media Type	Year	Number of Stations	Unique Items per Year
Radio	2000	43,973	65.5 million hours of original programming
	2002	47,776	70 million hours of original programming
Television	2000	21,342*	31 million hours of original programming
	2002	21,264	31 million hours of original programming

Source: Raw data from CIA World Factbook, 2002. Table, How much information 2003.

\* Note: We adjusted the 2000 TV figures downward to account for the repeaters and relay stations counted in the previous study.

**Table 6.3: United States – Comparison of production of original broadcast media items – 2003 sources**

--	--	--	--

Media Type	Number of Stations	Unique Items per Year	Conversion Factor	Total Terabytes (Annual)	
				Lower Bound	Upper Bound
<b>Radio stations (2002, FCC)</b>					
Commercial - AM	4,811	7.2 million hours	0.05 GB/hour	358 TB	358 TB
Commercial - FM	6,147	9.2 million hours	0.05 GB/hour	458 TB	458 TB
Educational	2,303	3.4 million hours	0.05 GB/hour	171 TB	171 TB
<b>Total</b>	<b>13,261</b>	<b>19.8 million hours</b>	<b>.05 GB/hour</b>	<b>987 TB</b>	<b>987 TB</b>
<b>Television (2002, FCC)</b>					
Broadcast Stations	1,686	3.1 million hours	1.3 GB - 2.25 GB hour	4,000 TB	6,923 TB
Cable Stations	308	.6 million hours	1.3 GB - 2.25 GB hour	731 TB	1,265 TB
<b>Total</b>	<b>1,994</b>	<b>3.6 million hours</b>	<b>1.3 GB - 2.25 GB hour</b>	<b>4,731 TB</b>	<b>8,188 TB</b>
<b>Total (radio + TV):</b>				<b>5,718 TB</b>	<b>9,175 TB</b>

Source: Raw data from U.S. Federal Communications Commission. Table, How much information 2003.

**Table 6.4: United States – Comparison of 2000 sources vs. 2003 sources**

Media Type	% change	Year	Number of Stations	Unique Items per Year
<b>Radio stations</b>	<b>5%</b>	1999	12,600	15.8 million hours
		2002	13,261	19.7 million hours
<b>Television (broadcast and cable networks)</b>	<b>6%</b>	1999	1,884	3.4 million hours
		2002	1,994	3.6 million hours

Source: Raw data from U.S. Federal Communications Commission. Table, How much information 2003.

## I. Radio

## A. Conversion Factor

Each hour of audio requires about **50 MB**, if stored at MP3 quality. (Different sources cite different figures, depending upon assumptions made about compression and sound quality.)

In the United States we estimate that FM stations broadcast 20 hours per day (7,300 hours per year), AM stations 16 hours per day (5,840 per year) and shortwave stations 12 hours per day (4,380 hours per year). For the world, we estimate that stations broadcast 16 hours a day.

To determine the percentage of original programming per broadcast hour, we began by looking at broadcasting patterns in the United States. According to the Radio Marketing Guide and Fact Book, from the Radio Advertising Bureau, about 84% of US radio stations have music as their primary focus, and provide little original content. Perhaps 10% (or 5 minutes an hour) of a music station's total broadcast time consists of commentary, weather reports, news updates, and traffic reports; the remaining time is filled by music and advertisements. Stations with non-music formats, such as news, talk, and religious stations, provide, presumably, mostly "original" information each day, perhaps 75% of their broadcast time; the remaining time is filled by advertising. Regardless of format, radio stations average between 12 and 16 minutes of commercials per hour.

For the world percentages, we do not have precise figures on the number of music and non-music format stations. We believe that other countries have more stations with non-music formats and therefore generate a higher percentage of original information. For our calculations below, we estimate 25% original per broadcast hour.

## B. World

There are 47,776 active radio stations in the world, according to the CIA World Factbook (online): about 15,800 AM stations, 30,700 FM stations, and 1,300 shortwave stations. Overall this represents an increase of 9%, with the FM format adding 4,800 stations and AM and shortwave losing 881 stations and 143 stations, respectively. ***Note: due to the irregular nature of the CIA Factbook data, it is possible that these shifts are caused by reporting errors, rather than any real change.***

Using the daily hours of broadcasting stated above, we estimate there are approximately **280 million** hours of radio programming per year. Applying the 50 MB/hour rule of thumb, one may estimate an annual storage requirement of about **14,000 TB** if one were to record everything broadcast on the radio.

Of this total, we estimate that **70 million hours** are original programming, with an annual storage requirement of about **3,500 TB**.

## C. United States

As of 2002, there are **13,261** radio stations in the United States, according to the Federal Communications Commission: 4,811 AM, 6,147 FM, and 2,303 FM Educational stations. Overall, this is a 5% increase from 1999's figures, with additional stations appearing in all 3 categories.

As noted above, AM and FM stations broadcast different numbers of hours each day: 20 hours for FM stations and 16 hours for AM. Total US broadcasting hours would therefore be roughly 89 million hours per year. Again, each hour of broadcasting would require 50 MB of storage, using the MP3 format. Total storage required for all US radio broadcasts is about **4,500 TB**.

Using the above conversion method, we estimate the total "original" programming appearing on the United States airwaves: **19.7 million** hours. (This estimate excludes advertising and music.) The equivalent in bytes is **987 TB**.

Syndicated programming has become a big business, and it is only getting bigger. Howard Stern earned about \$18 million last year, around the same salary as radio personalities Rush Limbaugh (\$30 million eight-year contract until 2009 despite his hearing loss), Dr. Laura Schlessinger (\$13 million) and Don Imus (\$10 million). Stern has signed an annual \$20-million contract with radio syndication firm Infinity, matching what champion golfer Tiger Woods receives to endorse Nike each year.

Satellite radio providers are expanding their markets with car rental companies and automobile makers. The Washington Post reports that XM Satellite Radio on Tuesday added 209,000 subscribers to its digital radio service in the second quarter of 2003; Washington-based XM said it ended the quarter with 692,253 subscribers. XM hopes to reach 1 million subscribers by the end of 2003.

## D. European Union (EU)

Unlike in the United States, according to the ENST report, the overall number of EU radio stations is decreasing: from 7,600 stations in 1994 to about 5,500 stations in 2000, representing a decrease of about 28%. However, in a few EU countries the number of stations has increased dramatically (in Greece by 800%, in Luxembourg by 600%, and in Sweden by 400%) since 1990. The 5,500 stations produce approximately 37 million hours of radio programs every year, with **6.8 million hours** of original programming, equivalent to **344 TB**.

## E. Online Radio

As of 2001, there were over 35,000 online radio stations broadcasting at varying hours each day, according to online radio advocate Jim Karpen. CNET reports that due to a court ruling in 2001 requiring payment of royalties for each song streamed over the Internet, the number of web radio stations has fluctuated widely, some stations closing permanently or temporarily in protest. As of 2002, the ENST study reports significantly lower numbers: 585 different digital radio services, 400 of which are in the European Union.

# II. Television

## A. Conversion Factor

The industry rule of thumb for storing video is 1 GB per hour. TiVo and Replay TV encode MPEG-2 at 1.2 GB per hour for video.

## B. World

The best source of information on the number of television stations worldwide is the CIA Factbook. Unfortunately, this data comes from different years and is reported in different formats. For instance, the totals for some countries include very low power stations and repeaters, while other countries report these stations in a separate category. Because reporting varies from year to year, it makes it difficult to evaluate time-series data.

There are 20,991 television stations in the world, according to the CIA Factbook. If these stations broadcast 16 hours per day, this would equal about 123 million hours total programming. We estimate about ¼ of the programs are "original," – this is **31 million hours** each year. Estimating that one hour of video requires 1.3 GB of storage, then worldwide, program storage would be about **40,000 TB**.

## C. United States

As of 2002, there are 1,686 broadcast television stations in the United States, according to the US Federal Communications Commission. This figure includes the major networks (ABC, CBS, NBC, FOX, PBS and newcomers WB, UPN and PAX) and the networks' affiliates, as well as local and public broadcasting

stations. In addition, the National Cable Television Association reports that there are 308 cable networks.

If all 1,994 of these stations broadcast 20 hours per day, that would equal about **14.5 million hours** per year. We estimate that about  $\frac{1}{4}$  of the television programs broadcast are “original” – this is **3.6 million hours** each year, equivalent to **between 4,700 TB and 8,200 TB**.

#### D. European Union

There are 659 channels in the EU, as reported by the ENST study. If these stations broadcast 20 hours per day, that would equal **4.9 million hours**. If we estimate that about  $\frac{1}{4}$  of the programs broadcast are original, this is 1.2 million hours each year, equivalent to between **1,560 and 2,700 TB**.

#### E. Consumption

According to Eurostat [2000] as reported by ENST, the average television viewing time in the United States was 4 hours and 20 minutes per day, as of 2000; in the EU viewing time is about 1 hour less: 3 hours and 24 minutes. 68% of the viewers in the United States receive their television by cable, 9% by satellite, and 23% by terrestrial reception. By contrast, the majority (51%) of EU viewers have terrestrial reception, 31% have cable and 19% have satellite.

#### F. Stock

In 55 years of programming, the networks have accumulated the following stock of material:

<b>Table 6.5: Stock of Material Accumulated by the Major Networks.</b>	
ABC	1,037,000 films/tapes
CBS	1,045,000 tapes and more than 150,000,000 feet of film
NBC	600,000 film reels (currently estimated at 100,000,000 feet) and 1,600,000 videotapes

*Source: Library of Congress Report, Television/Video Preservation Study: Volume 1: Report, October 1997.*

Meanwhile, some of the major studios have accumulated original materials as well:

<b>Table 6.6: Materials Accumulated by the Major Studios.</b>	
Disney	6,500 television programs on 80,000 reels and tapes
Fox	54,000 television programs on 780,000 reels and tapes
MCA/Universal	18,000 (through 1994) television programs on 217,000 reels and tapes
Paramount (Viacom)	8,000 television programs on 1,200,000 reels and tapes
Sony/Columbia	35,000 television programs on 600,000 reels and tapes
Turner Entertainment	20,000 television programs on 337,000 reels and tapes

Warner Brothers	28,000 television programs on 1,000,000 reels and tapes
-----------------	---

Source: *Television and Video Almanac 1998*

These figures overlap, of course, with those we have compiled for magnetic tape.

As of 1998, there are well over **18,000 hours** of programs in syndication available to be aired. This is equivalent to **18 TB** of information.

### III. Interesting Facts about Broadcast Media

- At this time, there is no Federal Communications Commission limit on the number of commercials per hour. For many years, TV stations and the networks subscribed to a voluntary broadcasting code that limited prime-time advertising to 9.5 minutes per hour (but allowed more at other times). In 1992, however, pressure to adhere to those guidelines was ruled a violation of antitrust law. An American Association of Advertising Agencies report showed that in the primetime slot on network television, time used by commercials was 16:43 minutes per hour. The daytime rate was 20:53 minutes per hour, while network news showed 18:53 minutes of commercials per hour, and late night news aired 19:06 minutes of ads per hour. The most interrupted program in all of network TV was ABC's Good Morning America.
- Recent internal research by Procter & Gamble indicates that consumers who fast-forward through ads with digital personal video recorders such as TiVo still recall those ads at roughly the same rates as people who see them at normal speed in real time. The popularity of TiVo and Replay TV does not yet seem to be taking off, since consumers may not see the benefit of a digital personal recorder instead of a video cassette recorder.
- The US market for cable and satellite TV services increased 8.8% from \$40.9 billion in 2000 to \$44.5 billion in 2001. Satellite TV remains the dominant source of television for many countries without the infrastructure or technology to support cable television in their area.
- Talk radio has been experiencing significant growth for a number of years and continues to grow. Radio listeners reported just under one and one-half hours (86 minutes) of radio news/talk listening on the average weekday. Adults 18 to 64 listen to an average of three hours of radio per weekday. Therefore this suggests that close to one-half of all radio listening involves news or talk. (News radio listeners account for 93 percent of all persons 18 to 64.)

**Table 6.7: Talk Radio Stations (U.S.)**

1980	75	1985	100
1987	125	1990	200
1991	350	1992	500
1993	750	1994	1000
1997	1250	1998	1350

Source: *Talker's Magazine Online, The Talk Radio Research Project; American Radio News Audience Survey*

## REFERENCES

- AdAge.com, March 17, 2003, "Tivo Less of a Threat? Surprising P & G Findings," <http://www.adage.com/news.cms?newsId=37390>
- [American Radio News Audience Survey](#)
- David Bounie, "The International Production and Dissemination of Information" (Paris: ENST, 2003).
- Cable and Television Overview 2002
- Charlotte Observer, Jan. 11, 2003, "Mute the Sound: TV Commercials Know No Bounds," [http://www.charlotte.com/mld/charlotte/news/columnists/jeff\\_elder/4922737.htm](http://www.charlotte.com/mld/charlotte/news/columnists/jeff_elder/4922737.htm)
- CIA Factbook 2002
- CNET, "Senate puts Webcasting Bill on Hold," October 18, 2002, <http://news.com.com/2100-1023-962556.html>
- EOnline, July 17, 2001, "Rush: Nine-Figure Dittohead," <http://www.eonline.com/News/Items/0,1,8552,00.html>
- Euromonitor International analysis <http://www.euromonitor.com/>
- Federal Communication Commission (FCC) - 6/30/02 Figures
- Forbes Magazine, Dec. 15, 2000, "Forbes Faces: Howard Stern," <http://www.forbes.com/2000/12/15/1215faces.html>
- Jim Karpen's Tips [http://site.lisco.com/lisco/karpentips/karpen\\_radio267.htm](http://site.lisco.com/lisco/karpentips/karpen_radio267.htm)
- Ron Kaufman, "Ratings and Advertising: What are Americans Really Watching?" <http://www.turnoffyourtv.com/ratingsAds.html>
- *Library of Congress Report, Television/Video Preservation Study: Volume 1: Report, October 1997*
- National Association of Broadcasters
- National Cable Television Association (NCTA)
- *Radio Marketing Guide and Fact Book*, Radio Advertising Bureau 2000-2001
- RadioTalk, Oct. 9, 2001, "Rush Limbaugh's Hearing Loss," <http://www.radiotalk.org/limbaughdeaf.html>
- Talker's Magazine Online, The Talk Radio Research Project; <http://www.talkers.com/talkaud.html>
- *Television and Video Almanac 1998*
- Wired Magazine, Dec. 20, 2002, "Is that a TiVo Under the Tree?" <http://www.wired.com/news/gizmos/0,1452,56828,00.html>

Broadcast

- *The Washington Post*, July 7, 2003, "XM Satellite Shares Rise on Gain in Subscriptions,"

Release date: October 27, 2003. © 2003 Regents of the University of California