

## **Music: Cassettes to the Internet**

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Access to music has become seamless thanks to the internet. Today one can listen to any song, almost anywhere, and in most cases, for free. There are tons of music streaming apps to choose from and then there is also YouTube. Don't wish to manually search for a song, no worries, just ask your digital voice assistant at home or on your smartphone to play the song of your choice. It has become quite easy. Life wasn't so simple back in the 90s. One either had to tune in to the radio or go out and purchase tapes or CDs. The transition from physical storage media to digital formats mostly relied on the internet and of course, the wide adoption of the MP3. Songs were compressed to lower bitrates so that they could fit onto the tiny storage of mobile phones. MP3 is actually a digital audio coding format that was made in 1993. It was widely adopted due to its small size and acceptable fidelity especially at a time when bandwidth and storage were not cheap. Soon enough, we saw numerous MP3 CDs and music players piling up the markets. Of course, the internet being the internet, became the perfect stage for piracy, unlicensed sharing of music as well as numerous copyright infringement cases. Who can forget the infamous Napster controversy? It was a big moment in the history of music and the internet. Using peer-to-peer file-sharing technology, Napster allowed people to share MP3 files with other users. The company was later sued by the acclaimed heavy metal band Metallica. Eventually, Napster shut down in 2001 after losing the case where various musicians and recording studios sued the company on the ground of contributory and vicarious copyright infringement under the US Digital Millennium Copyright Act (DMCA). One of the biggest technologies that allowed platforms like Napster to thrive in the early 2000s was peer-to-peer (P2P) sharing.

Remember Limewire? No? How about Torrents? Theoretically, a very simple concept, P2P sharing allows files on your PC to be shared with other people using the internet. One could access these files through P2P software that would search for other connected PCs on a P2P network to locate the desired content. The problem was, P2P was majorly being used to share illegal and pirated content including movies, music, video games and whatnot. This also gave hackers a perfect pathway to spread malware and infect numerous PCs in one go.

Despite internet regulations, P2P based software still exist. However, the arrival of music streaming apps and services have entirely changed the way we consume music today. Local players like Gaana and Saavn (now JioSaavn) took the early advantage in India and started offering Bollywood, regional, and various other music categories under affordable as well as free tiers. However, they only started to gain traction in the market with the introduction of the Jio SIM in 2016 that led to the massive adoption of the internet due to its low data rates. This was soon followed by Google, Apple, Amazon, and Spotify entering the Indian market with premium, yet fairly affordable options compared to the global pricing. According to the Indian Music Industry (IMI), the representing body for record labels in the country, there are 200 million unique subscribers of these apps. These figures are from February 2020, right before the pandemic, which means that the numbers today are presumably much higher. During the same period, Gaana had recorded over 150 million monthly active users while JioSaavn had

more than 100 million active users in India. Spotify, which is known to be one of the biggest music streaming names globally, managed to get two million users in just a month of its launch in India back in 2019.

Despite having impressive numbers, the music streaming industry in India is still not at its full potential. While there are a few people who are ready to pay for premium services, the majority still prefers free access even if they deal with annoying ads, since it's a really small price to pay. In fact, free access to music is so popular in India, that one of the most popular channels on YouTube is Bollywood music label, T-series. That's not all, Indian Music Industry (IMI) published a report IN 2019 suggesting that 67 percent of people in India still listen to pirated music which is way above the global average of 27 percent. A majority of those who are not pirating music, still rely either on the radio or just go to YouTube to listen to songs. This essentially means music streaming services are going to continue gaining more attraction in the country in the coming years. There is still a vast population that is unaware of the concept of such apps, let alone people who don't even have the internet.

Regardless of their popularity today, every format on this list played its part in the march towards digital domination. We strolled through the odd history of music formats to explore where that journey has taken us — and where it might lead...

Here's the music format timeline — from **vinyl** to **digital** and everything in between.

### **1948: The Record**

Records, or discs, of varying speeds and materials have actually been around since the early 1900s — early versions rotated at 78 RPM (*vroom, vroom!*) and were made of shellac, which made them noisy (the bad kind of noisy, not the good kind) and fragile. In 1948, Columbia Records produced a 33 RPM 12-inch “long play” format, which we know, love, and donate to thrift stores today as the **LP**. The **first LP ever pressed** was titled Columbia ML4001, and was a “Mendelssohn Violin Concerto in E Minor” by violinist Nathan Milstein with the New York Philharmonic Symphony Orchestra, conducted by Bruno Walter. Shortly after, RCA Records<sup>1</sup> developed a 45 RPM 7-inch “extended-play single” format, or the **EP** for short.

Because of the fragility of shellac, which was frequently broken during transport, both Columbia and RCA Records eventually began producing their LP and EPs on vinyl. Size and portability were the biggest strikes against vinyl. Eventually the music industry sought to find a solution and developed new formats that people could easily bring with them to work, parties, etc.

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*\*1 : RCA Records is an American record label owned by Sony Music Entertainment, a subsidiary of Sony Corporation of America. RCA Records is one of Sony Music's four flagship labels, alongside RCA's former long-time rival Columbia Records; also Arista Records, and Epic Records.*

Despite the numerous physical formats that have been created since vinyl records, the market for them is still strong. But despite vinyl's sustained popularity over time, vinyl was set aside as the go-to format as listeners looked for the next best thing.

### **1963: Compact Cassette**

Compact Cassettes, or tapes, were invented by the Philips company and introduced to Europe at the **Berlin Radio Show** — Europe's oldest tech convention with a rich history of its own. Early cassettes featured reverse housing with a max play time of 45 minutes of stereo audio per side — significantly longer than a vinyl LP's playtime. Tapes also fit in a more affordable, compact package. The small size of tapes gave rise to portable players, making them a convenient development in the history of how and where we listen. The cassette also fit perfectly into the post-war era. A boom in population and suburban expansion meant cars... lots of cars. So the need for mobile playback systems and formats was a hot concept.

The invention of tapes also introduced a volatile new concept into recorded music: **PIRACY**.

The advent of cassettes and cassette recorders caused record companies to predict devastating effects on the music industry. After unsuccessful attempts to tax blank tapes, the DAT (digital audio tape) Bill was introduced in 1989, which restricted the amount of tapes consumers could buy and prevented them from making copies of copies (a.k.a., the SCMS system).

However, it didn't help record labels, who believed that a tax should be paid to them. In 1991 the **Audio Home Recording Act** was introduced, which collected tax from media and record makers and distributed it back to labels.

**But it wasn't all suitcases, court cases, and taxes on tapes.** Cassettes also birthed Mixtape culture, giving amateur compilation creators a way to record audio off of multiple records and compile a single playlist — a concept that **runs the music industry** as we know it today.

These days tapes certainly aren't our main mode of listening, but the industry is still active.

### **1964: 8-Track Tape**

The 8-track tape was a collaborative invention between the unlikely trio of RCA Records, Lear Jet Company, and Ampex Magnetic Tape Company. This may seem like somewhat of an odd group, but **Bill Lear**<sup>2</sup> of Lear Jet Corporation, along with his employee **Richard Kraus**, were responsible for designing the cartridge for 8-track tapes.

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*\*2- William Powell Lear or Bill Lear (June 26, 1902 – May 14, 1978) was an American inventor and businessman. He is best known for founding Learjet, a manufacturer of business jets. He also invented the battery eliminator for the B battery, and developed the car radio and the 8-track cartridge, an audio tape system. Throughout his career of 46 years, Lear received over 140 patents.*

Lear, who manufactured private, luxury aircrafts, had an interest in audio and previously tried to create an endless-loop wire recorder in the 1940s. The benefit of 8-track tapes over the compact cassette was their ability to house 8-parallel soundtracks with four corresponding stereo programs — they could play a lot of music in a relatively small package. Much of the 8-track's success is thanks to the booming automobile industry of the time. By 1966, Ford Motors offered 8-track players as an option in their complete line of automobiles produced that year. At-home players were introduced the following year, and many saw the 8-track as a solution to the portability issue of records and record players.

Despite their popularity in the '60s and '70s, the compact cassette took over as the more popular choice for artists and consumers due to its favourable size and price-tag. As a result, the 8-track became largely obsolete then, and today.

### **1972: Floppy Disk**

Floppy disks are normally associated with data storage for desktop computers, but during the '80s and '90s a select-few artists began releasing albums on this somewhat unconventional format. **IBM** introduced the 8-inch floppy disk to the tech world in 1972, which was followed with a 5¼-inch model in 1976, and finally replaced with a conveniently-sized 3½-inch format in 1982. The floppy release remained fairly niche and never truly hit the mainstream.

There were also a handful of **major releases on diskette** that tried to bring a “multimedia” angle to albums, but the format simply never caught on. Regardless of diskette's ill-fated moment in music, **the floppy represents an important foreshadowing of music's digital future** — a trend that would soon be taken up by the CD explosion...

### **1982: Compact Disc**

In 1974, Philips (the same Philips of tape fame) had the initial idea for CDs as a replacement for records and cassettes. During the same time, Sony was also working on their own prototype (CD wars!). Sony's offering was first demoed in 1976. Eventually the two companies came together and **CDs were officially launched** as a viable format in 1982. Sony also introduced the **first ever CD player** that year, the CDP-101 Compact Disc Player, **which cost \$1000!**

With CDs also came portable CD players, CD-ROM drives, writable CDs and the 16-bit/44.1kHz benchmark for **audio formats**, which all had their own effect on how we listen to music. CDs also brought together the best of every format that came before it: high-quality audio, compact, portable, writable and inexpensive.

Overall, the CD was an extremely important development for the music industry, becoming the *de facto* release format for decades. But in many ways the CD was the beginning of the end for physical formats. Computers and the MP3 (more on this in a minute) quickly took over our listening habits. With the invention of the internet and as computers became more sophisticated, so did the constant demand for convenience. It was a need the CD and Discman

could only fill for so long. As soon as it became possible to access music through computer or MP3 player, most people no longer wanted to have physical copies of music when they could store everything in a folder on their desktop. Of course, CDs didn't just evaporate overnight. They had their own popularity and growth in the market.

### **1992: MP3**

The MP3 was originally developed in the the early '80s by researcher **Karlheinz Brandenburg**<sup>3</sup>. His post-doctoral work at the **AT&T Bell Labs** expanded on pre-existing codes for compressing audio. In a strange twist, Brandenburg chose **Suzanne Vega's** 1987 hit, "**Tom's Diner**" as a test song to perfect the MP3.

But it wasn't until 1992 that the MP3 went mainstream, and not until 1999 — with the creation of Napster — that the format really caught fire. Napster allowed for free peer-to-peer file sharing of the MP3 audio file that resulted in widespread copyright infringement and understandable outrage from the music industry.

Despite its brief three-year run in its initial form, Napster eventually paved the way for platforms like the iTunes store — allowing users to search, purchase, and instantly play music all with a few clicks. The effects from the shockwave that the MP3, piracy, and pure digital formats created are still being felt today. In many ways, the music industry is just now starting to recover from its own digital dawn.

### **2002: Streaming**

With 24/7 internet accessibility expanding thanks to mobile, developers and entrepreneurs saw the opportunity for something big: the possibility of listening to, and discovering, new music without having to actually download files or purchase songs.

Additionally, streaming platforms aimed to (hopefully) make digital music a sustainable business model for everyone involved. In many ways it has, but there's still a long way to go. The release of the iPhone in 2007 is what really caused streaming and internet radios popularity to skyrocket. Apps that were previously desktop only, were now available at the palm of your hand. The following year Spotify launched, which runs off of paid advertisements. Users have two choices: listen for free with ads, or pay a monthly fee for unlimited, uninterrupted streaming. Streaming apps filled the creeping demand for non-physical access to music and ushered in a new wave in music format.

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\*3: *Karlheinz Brandenburg (born 20 June 1954) is a German electrical engineer and mathematician. Together with Ernst Eberlein, Heinz Gerhäuser (former Institutes Director of Fraunhofer IIS), Bernhard Grill, Jürgen Herre and Harald Popp (all Fraunhofer IIS), he developed the widespread MP3 method for audio data compression. Brandenburg has been called the "father of the MP3" format*

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