Immersive Audio in Streaming - Cheat Sheet

Fora Soft Learn

Dolby Atmos and immersive audio on Netflix, Disney+, Apple TV+, Tidal & Apple Music.

Who ships what (2026)

SERVICE	CODEC	BITRATE	RENDER PATH
Netflix	DD+ JOC (ec-3)	up to 768 kbps	Living room; decoder rebuilds height
Disney+	DD+ JOC (ec-3)	up to 768 kbps	Living room; decoder rebuilds height
Apple TV+	DD+ JOC + Spatial	768 kbps	Home theater OR head-tracked AirPods
Tidal	Dolby AC-4 (IMS)	~256-768 kbps	On-device binaural for headphones
Apple Music	Atmos (lossy)	768 kbps	On-device HRTF binaural (7.1.4 room)

How the manifest signals immersion (HLS / DASH)

DD+ JOC (E-AC-3)	CODECS = ec-3	CHANNELS = "12/JOC" (5.1.4 / 7.1.4); "16/JOC" (9.1.6)
AC-4 immersive	CODECS = ac-4	CHANNELS = "2/IMSA,ATMOS"
MPEG-H 3D Audio	CODECS = mhm1	profile / level carried in the codec string

Bitrate & storage math (90-min feature)

size(bytes) = bitrate(bits/s) x duration(s) / 8

Stereo dub 128 kbps: 128000 x 5400 / 8 ~= 86 MB.

Atmos DD+ JOC 768 kbps: 768000 x 5400 / 8 ~= 518 MB (~6x a stereo language).

1080p video 5 Mbps: 5000000 x 5400 / 8 ~= 3.4 GB. Atmos audio ~= 15% of the video.

Remember

- [ ] JOC = render the Atmos scene to a 5.1/7.1 bed, compress it, add small side data to rebuild height.
- [ ] DD+ JOC is backward compatible: a non-Atmos decoder reads the 5.1 core and ignores the side data.
- [ ] E-AC-3 / JOC is standardized in ETSI TS 102 366 (Annex E). AC-4 in ETSI TS 103 190-1/-2 (V1.3.1, 2025-07).
- [ ] Apple Spatial Audio is playback-side processing (HRTF + head tracking), NOT a delivery codec.
- [ ] 768 kbps is Netflix's perceptually-transparent ceiling (raised from 448 kbps, May 2019) - not lossless.
- [ ] A wrong CHANNELS signal (e.g. '6' instead of '12/JOC') breaks Atmos at the player, not at the encoder.