Speech Codecs - Cheat Sheet

Fora Soft Learn

G.711 vs G.722 vs AMR vs EVS - bandwidth, bitrate, where you meet them, and the transcoding ceiling.

The one fact

When your call hits the phone network, a gateway transcodes Opus into a speech codec.
That far-side codec is the quality ceiling: land on G.711 and it can only sound like a phone.

The four codecs at a glance

Codec	Year	Bandwidth	Bitrate	Where
G.711	1972	Narrowband 3.4 kHz	64 kbit/s fixed	VoIP/SIP fallback, PSTN
G.722	1988	Wideband 7 kHz	48/56/64 kbit/s	Desk phones, conf. bridges
AMR	1999	Narrowband 3.4 kHz	4.75-12.2 (8 modes)	2G / 3G mobile voice
AMR-WB	2001	Wideband 7 kHz	6.6-23.85 (9 modes)	3G / 4G HD Voice
EVS	2014	NB -> Fullband 20 kHz	5.9-128 kbit/s	VoLTE / VoNR, modern mobile

What to remember

Speech vs music	Speech codecs model the vocal tract (ACELP) - carry a voice at far lower bitrate than music codecs.
G.711 = the floor	Two ends that agree on nothing else fall back to G.711. RTP PT 0 = mu-law, PT 8 = A-law.
Wideband caveat	Wideband helps only if every box in the path supports it AND the source was captured wide.
AMR adapts	AMR / AMR-WB switch bitrate every 20 ms to survive bad radio - more bits when signal is strong.
EVS = AMR-WB compatible	EVS reaches fullband 20 kHz and talks to AMR-WB phones without a quality-wrecking transcode.

Pitfall: 'wideband' does not guarantee a better call

One narrowband box in the path drags the whole call back to 3.4 kHz. Design for the weakest link, not the codec name in your own config. Minimize transcodes; keep a clean G.711 fallback.