

Mean Opinion Score- MOS

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In multimedia (audio, voice telephony, or video) especially when codec are used to compress the bandwidth requirement.

(for example, of a digitized voice connection from the standard 64 kilobit/second PCM Modulation),

The Mean Opinion Score (MOS) provides a numerical indication of the perceived quality of received media after compression and/or transmission.

The MOS is expressed as a single number in the range 1 to 5, where 1 is lowest perceived quality, and 5 is the highest perceived quality.

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■ Some suitable English-language phrases used for determining a MOS as suggested by ITU-T recommendation

- You will have to be very quiet.
- There was nothing to be seen.
- They worshipped wooden idols.
- I want a minute with the inspector.
- Did he need any money?

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The MOS is generated by averaging the results of a set of standard.

subjective tests where a number of listeners rate the heard audio quality of test sentences read aloud by both male and female speakers over the communications medium being tested.

A listener is required to give each sentence a rating using the following rating scheme:

Mean Opinion Score (MOS)		
MOS	Quality	Impairment
5	Excellent	Imperceptible
4	Good	Perceptible but not annoying
3	Fair	Slightly annoying
2	Poor	Annoying
1	Bad	Very annoying

A typical range for Voice over IP would be from 3.5 to 4.2.

The MOS is the arithmetic mean of all the individual scores, and can range from 1 (worst) to 5 (best).

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User Opinion

User Opinion	Score	MOS
Maximum obtainable for G.711		4.4
Very satisfied		4.3-5.0
Satisfied		4.0-4.3
Some users satisfied		3.6-4.0
Many users dissatisfied		3.1-3.6
Nearly all users dissatisfied		2.6-3.1
Not recommended		1.0-2.6

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As an example, the following are Mean Opinion Scores for one implementation of different codecs:

Codec	Data rate [kbit/s]	Mean Opinion Score (MOS)
G.711	64	4.3
iLBC	15.2	4.14
AMR	12.2	4.14
G.729	8	3.92
G.723.1r63	6.3	3.9
GSM FER	12.2	3.8
G.726	32	3.8
ADPCM	32	3.8
G.729a	8	3.7
G.723.1r53	5.3	3.65
GSM FR	12.2	3.5

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Acceptable MOS for Narrowband CODECs

User Opinion	MOS Score
Maximum obtainable for G.711	4.4
Very satisfied	4.3-5.0
Satisfied	4.0-4.3
Some users satisfied	3.6-4.0
Many users dissatisfied	3.1-3.6
Nearly all users dissatisfied	2.6-3.1
Not recommended	1.0-2.6

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Software Automated Mean Opinion Score Tests

MOS tests are quite subjective and less than productive in many ways.

There are nowadays a number of software tools that carry out automated MOS testing in a VoIP deployment. Although they lack the human touch.

The good thing with these tests is that they take into account all the network dependency conditions that could influence voice quality.

Some examples are AppareNet Voice, Brix VoIP Measurement Suite, NetAlly, PsyVoIP and VQmon/EP.

Conclusion

At last, we conclude that Mean Opinion Score is one of the better and reliable ways to estimate the quality of service for a VoIP Network.