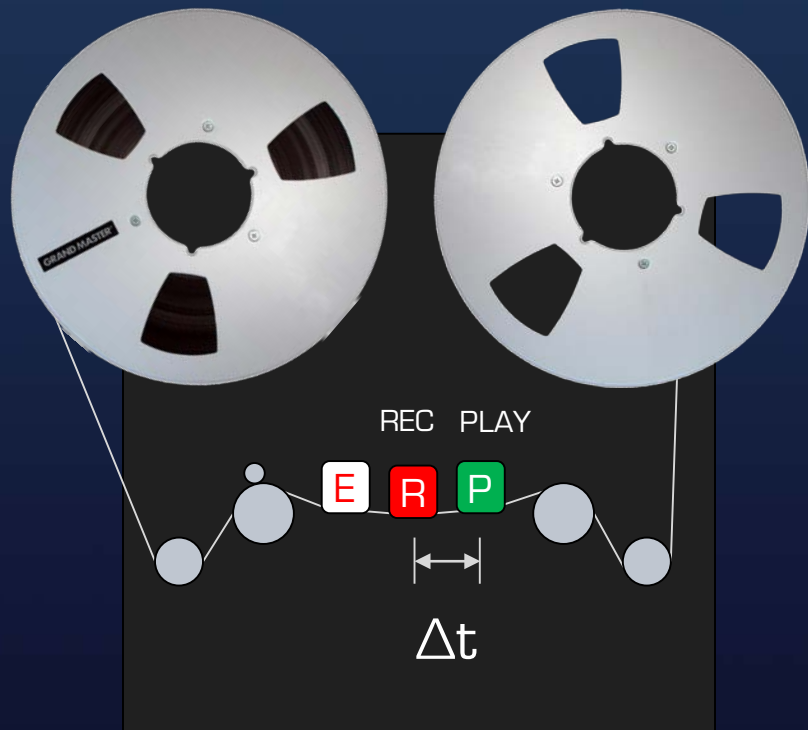


What does Low Latency Mean?



And When Does It Matter?

What is Latency?

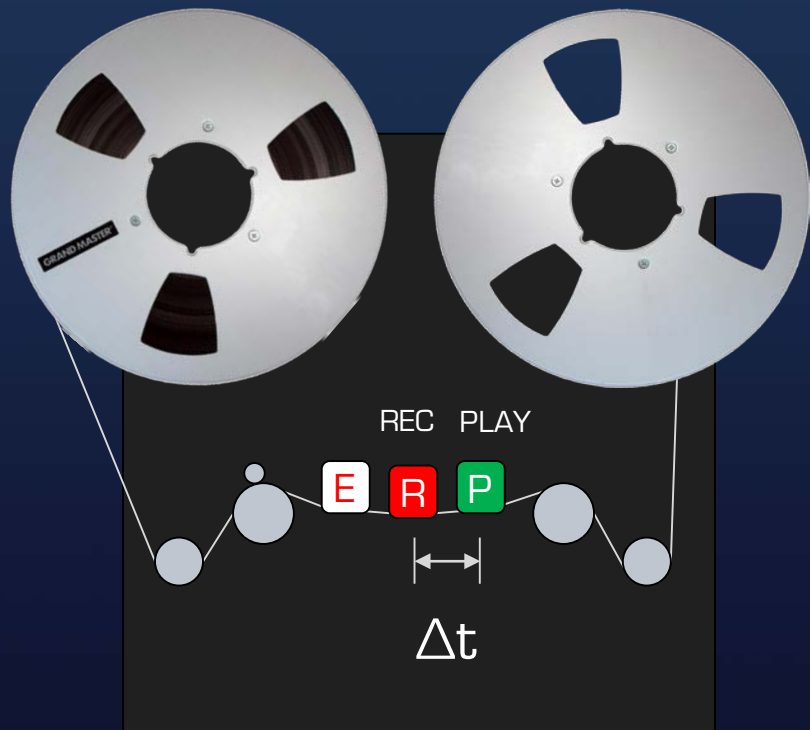


Latency is the amount of time it takes to get a signal from one point to another.

“Delay is an intended effect. Latency is a by-product.”

- *Patrick Killianey*

Is this Delay or Latency?



It is “Delay” if this is part of a slapback delay effect.
The Δt was intentional.

It is “Latency” if you are doing tape saturation effect or confidence monitoring.
The Δt was incidental.

When Does Latency Matter?



Low Latency



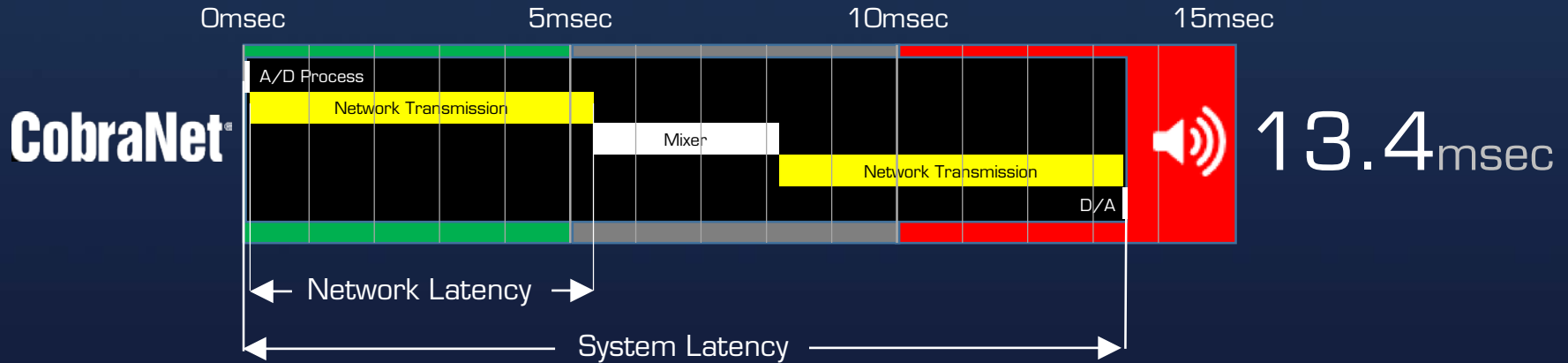
Medium Latency,
High Accuracy



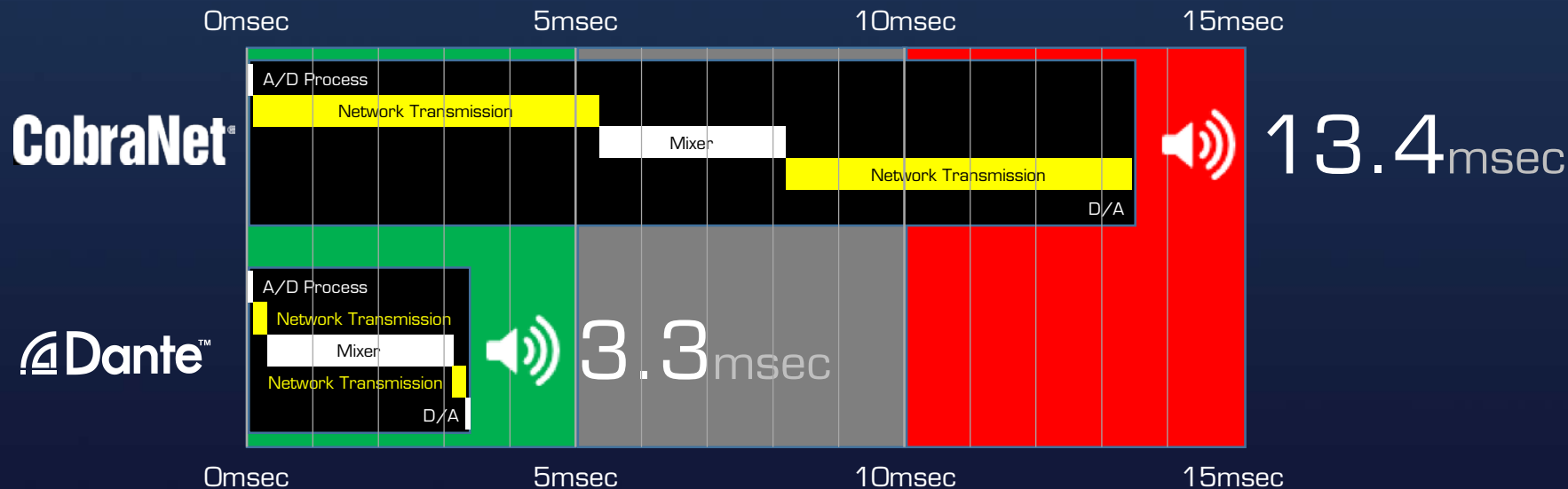
Med-High Latency

You have a reference to the original signal.
You need separate sources or destinations in phase.
You have “closed loop” communications.

Network Latency vs System Latency



Network Latency vs System Latency



When Does Latency Matter?



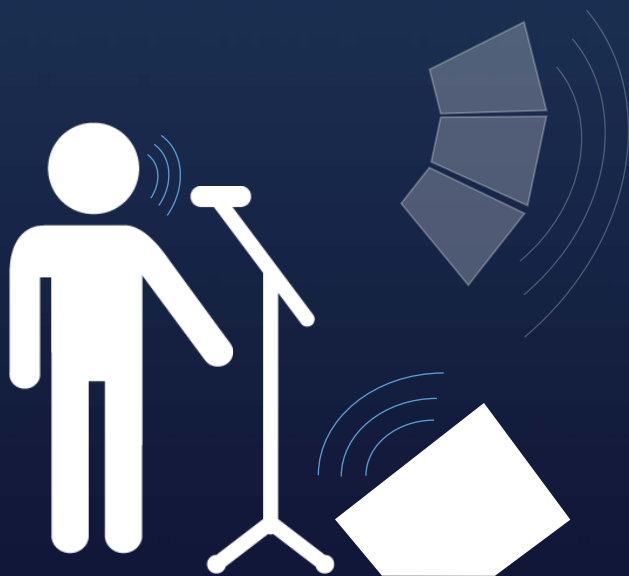
When you need to hear yourself
...in time.

When Does Latency Matter?



When you need to hear yourself
...in time.

When Does Latency Matter?



Speech Jammer

≈150 msec

PIT 9 9TH 0-2 CIN 1

reds.com reds.com reds.com reds.com reds.com reds.com
GEICO GEICO



The Hardest Thing in Sports...

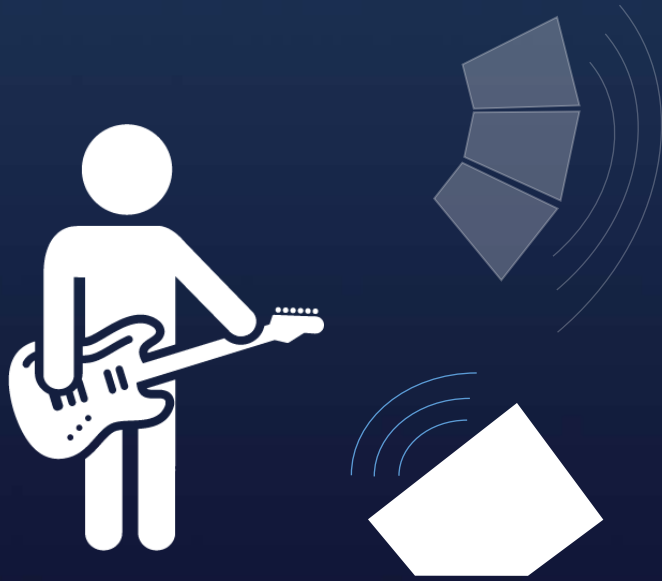


Speed: 97 mph

Distance: 60.5 feet

Time to Plate: 425 msec

How Does Latency Affect Us




Bill Haley and the Comets, The Ed Sullivan Show or Toast of the Town, CBS, Sunday, August 7, 1955.

How Does Latency Affect Us



Tempo:  88 bpm

Beat:  682 msec

Guitar Solo:  85 msec

10 msec: 12% of the note
(Latency)

How Does Latency Affect Us



97mph Pitch
Time to Plate: 425 msec

Guitar Solo:  85 msec

1 pitch = 5 guitar solo notes
Do it 6 times back-to-back

How Does Latency Affect Us




Donato "Danny" Cedrone



Bill Haley and the Comets, The Ed Sullivan Show or Toast of the Town, CBS, Sunday, August 7, 1955.

How Does Latency Affect Us



	RECORDING	LIVE
Tempo: 	88	103 bpm
Beat: 	682	582 msec
Guitar Solo: 	85	73 msec

10 msec:
(Latency)

12% 14%



Auditory Perception

Can't Talk
80-260msec

Talk-Over Interruptions
>300msec

Slow Envelope
Uncoupling
10-20msec

Percussive Uncoupling
5-10msec

Individual Effect

Musical Timing
Issues
>15-20msec

Collaborative Effect

What Instrument Family?



Brass



Percussion



Wind



Percussion



Percussion

Dante is Fast and Accurate



Dante Latency	$\frac{1}{4}$ msec	$\frac{1}{4,000}$
Dante Accuracy	< 1 μ sec	$\frac{1}{1,000,000}$
Speed of Sound	1125 feet/sec	
<hr/>		
Distance Sound Travels in 1 μ sec	< 0.014 in ($1/74$ "	
	< 0.342 mm	



In reality, there is more phase variation caused by your rigging hardware than by Dante.

Dante Allows Multiple Latencies

Transmitter	Receiver	Playout
0.25 msec	1 msec	1 msec
1 msec		1 msec
10 msec		10 msec

Dante Plays Out at the Longer of the Two Latency Settings