



# NATS Bootcamp: Get Your Marching Orders

Laggy & "Lagless" Platforms, Audio Equipment, and  
Emergent Solutions

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## Here's the Plan!



- Big Picture
- Internet Connection Type
- Laggy Platforms
- Low Latency Platforms
- Equipment Needs
- Wrap up!

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## First Things First:

- Truths that change (**constantly**)
- Providing options at varied and reasonable price points
- Anecdote vs. Evidence
- No financial interests or conflicts
- Our team:

Howell-New England Conservatory

Gautreaux-New England Conservatory

Ballentyne-Stetson University

Glasner-Clarke University

Perna-Mississippi College



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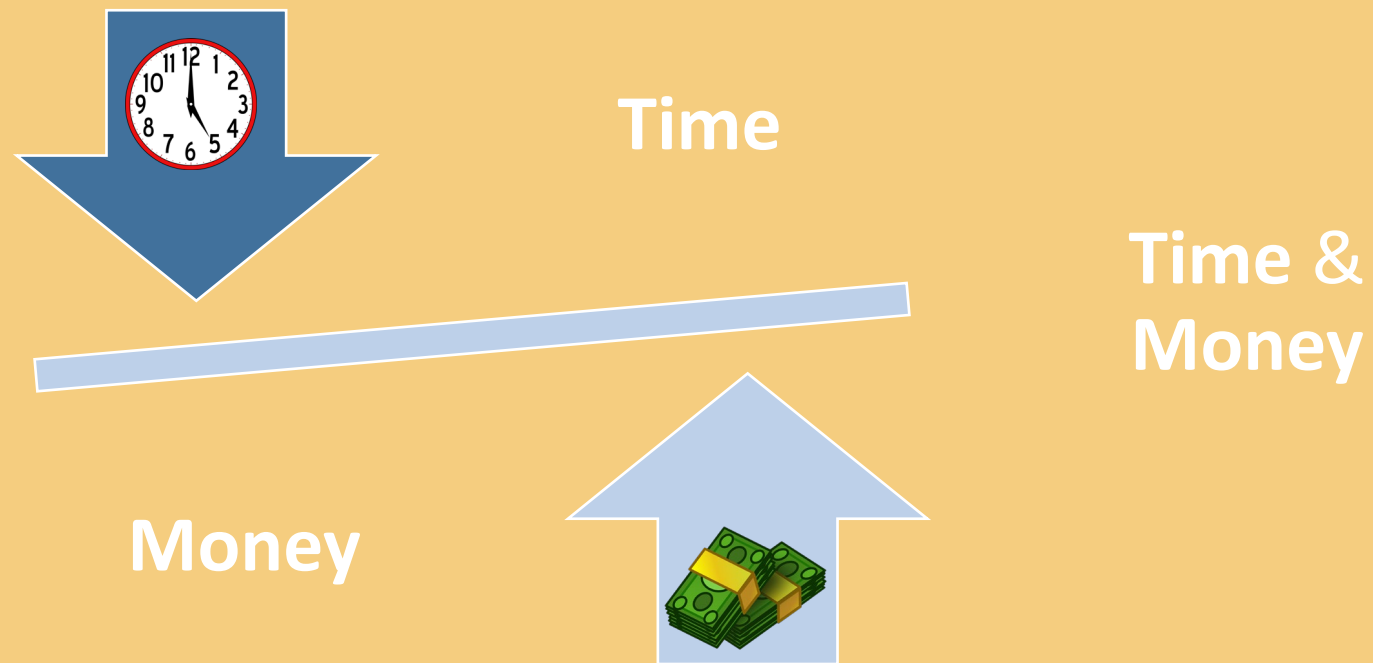
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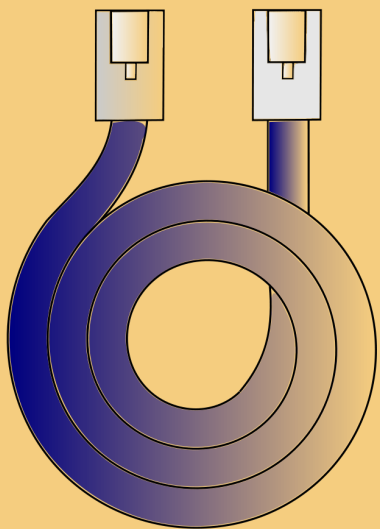
# Everything costs something...



## Step One: Ethernet Connection

### Why?

- Stability
- Learn your router
- Type of cable



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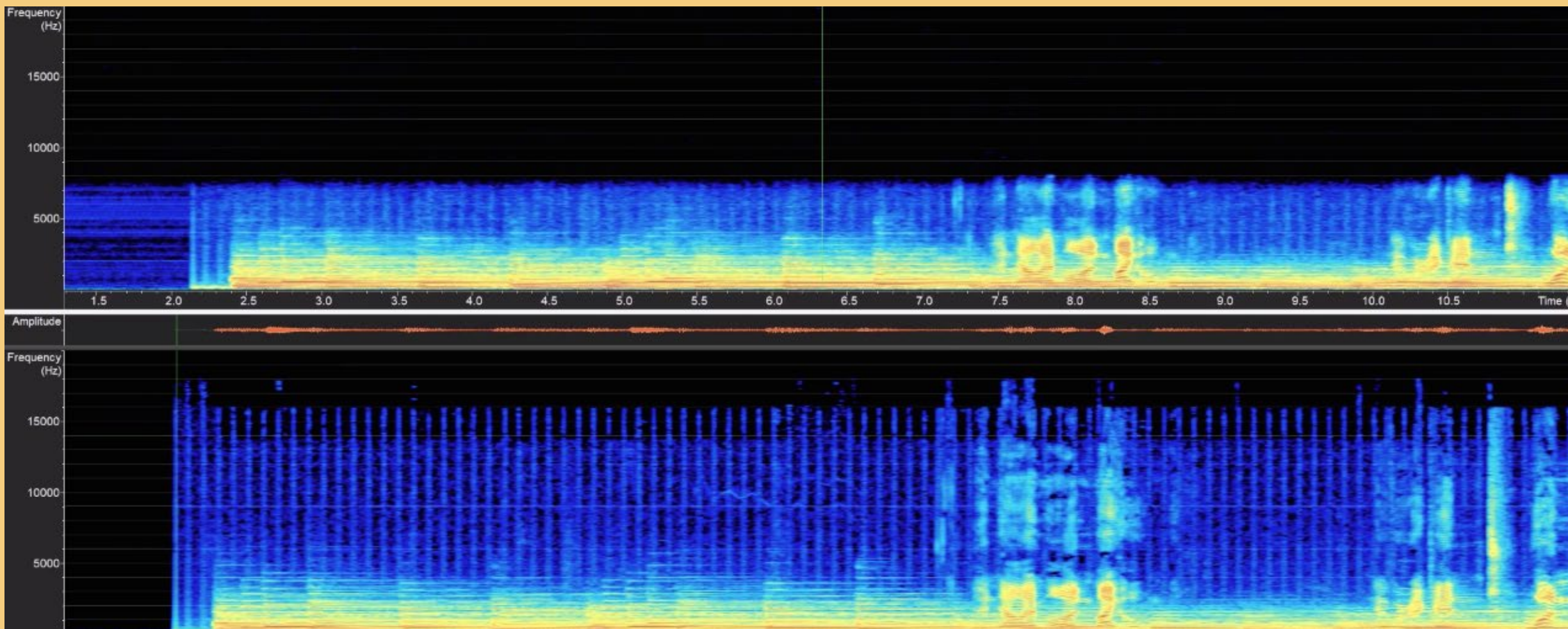
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# Laggy Platforms: Why change?



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## Laggy Platforms:

- **Cleanfeed**
  - Only teacher needs subscription (Pro = \$22, Regular = free)
  - Mac OS, Windows, Android can host or guest, iOS can guest
- **Source-Connect Now**
  - Only teacher needs account (In beta = free for all)
  - Mac OS or Windows





The screenshot shows a Zoom meeting interface. At the top, there are controls for 'Record', 'Clips PRO', and 'Audio'. On the right, there are 'Get PRO' and a user profile icon. Below this is a participant list showing 'Nicholas Perna' with a microphone icon and the text 'Muted'. A gear icon for settings is visible on the right of the participant name. In the center of the meeting area, there is a '+ CONNECT' button. At the bottom left of the meeting area, the 'cleanfeed™' logo is displayed.





## Laggy Platforms Lesson Setup:

- Consider **Jitsi Meet** (Mute Audio)
  - <https://meet.jit.si/>
  - WebRTC
  - Doesn't mix video, sends peer-to-peer
- Connect to **Cleanfeed** for audio



What is a "low-latency" audio platform?

- Some current options

Soundjack

JackTrip

Jamulus

Likely soon to be others

JamKazam

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Or perhaps you'd like to have the potential for ensembles?

Credit: NEC Prep Jazz Faculty Quartet



<https://bit.ly/31xGMJs>

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## What does Soundjack cost?

- No \$ for the service itself.
- But likely a little bit of TIME.
- May have to buy tech.
- Soundjack user guide: <https://www.ianhowellcountertenor.com/soundjack-real-time-online-music>



## What does Soundjack look like?

SJC Engine (left) + user list (right) – boot time: 5 seconds

expert settings  
public stage  
manually accept calls  
192.168.0.69  
**no audio**  
no audio  
48000 Hz  
sample buffer: 64  
send channels: 1  
0 sample buffers self delay  
send local audio only  
network buffer: 256  
codec: OPUS 96 kbps  
no video  
off

- localhost
- Mirror (Germany)
- Mirror (East US)
- Mix Server Köthen
- Mix Server Nürnberg
- pascalguit
- capti0n
- colinelliott
- 3perf
- Nell
- rsaitkoulov
- tenortom
- PeteMazza
- nick.sullivan
- Ohdelic
- JackWood
- vocalfriperna

Yellow = No Audio

SJC Engine (left) + user list (right) – boot time: 5 seconds

expert settings  
public stage  
manually accept calls  
192.168.0.69  
AudioBox USB 96  
AudioBox USB 96  
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## What about all this router stuff?

- If you are on campus LAN (local area network), no network configuration
- If you are remote
  - Access router admin
  - Set QoS/Device Prioritization
  - Port Forward one port



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## What tech do you absolutely need?

- Harder to answer and **situation dependent**
- Soundjack works on Mac OS, Windows, or Linux
- Computer (Low cost replacement options: \$350 for FMB)
- **Low-latency** audio interface (Start at \$99)
- Microphone (Could start as low as \$25)
- Takeaway: **This is possible** for around \$500 per person assuming you have *absolutely no equipment* already.



...AND, there is **no ongoing *subscription cost***.

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## Equipment Needs:

- What is the purpose of your recording?
  - Varying needs
- Which model is not so important.
- Look at the specifications.





# Internal or External Hardware?



OR



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## Audio Interfaces:

### Why do I need one?

- Provide power (*phantom power*) to condenser microphones.
- XLR mics
- Easily adjust gain
- Lower signal-to-noise ratio
- Larger dynamic range



## Audio Interfaces (Specifications):

- Number of inputs/outputs
- Frequency Response
- Dynamic Range (also bit rate)
- Signal-to-Noise Ratio
- Latency
- OS Compatibility



Microphones:

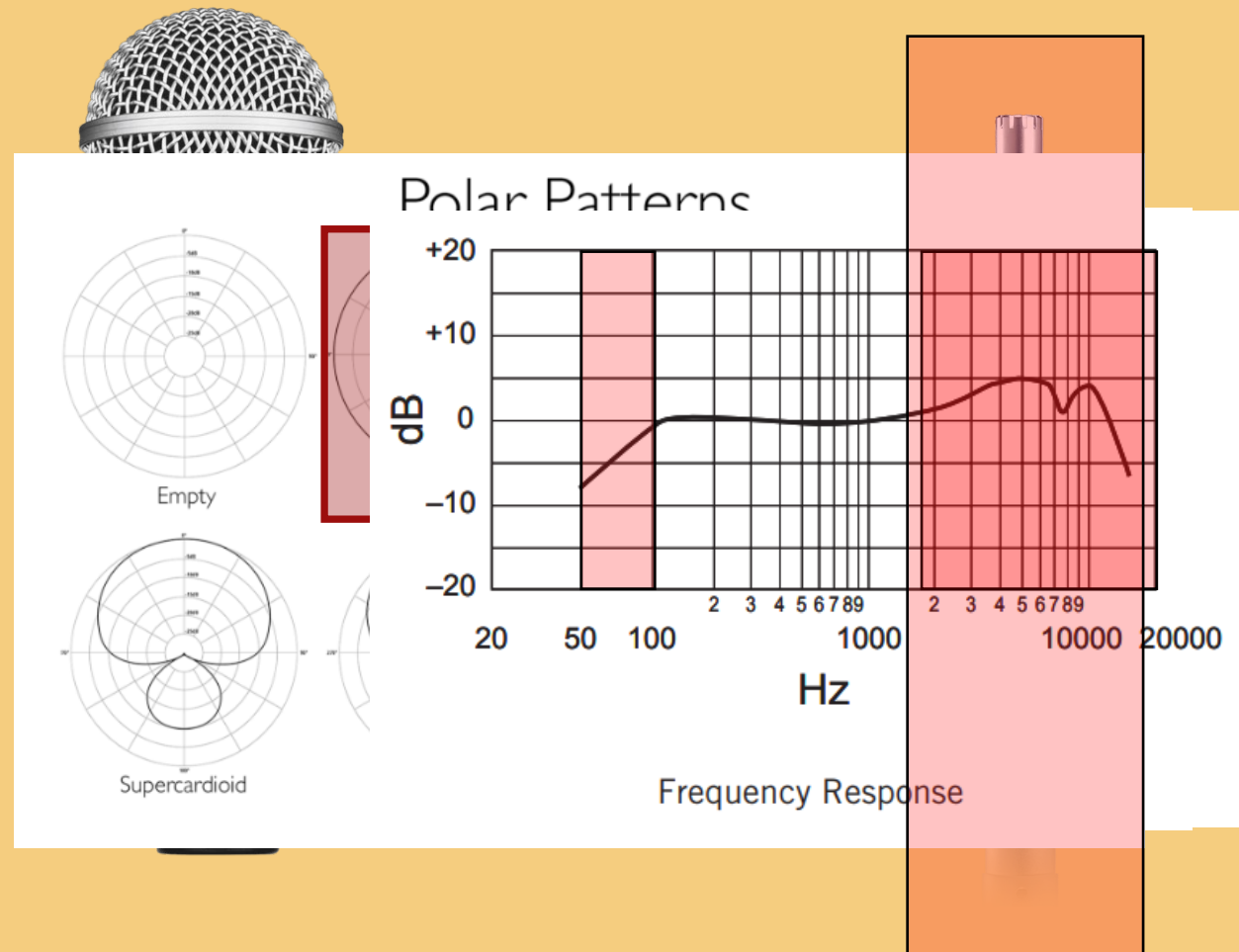
Polar Pattern

Frequency  
Response

Capsule/Diaphragm  
Type

Max SPL

USB or XLR



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## Headphones:

- Individual needs (i.e. Every head is different!)
- Echo Cancellation
- Lombard Effect (Kind of)
- Surrounding Distractions 😊
- Frequency Response
  - Individual hearing/HRTF
  - > 60 dB Signal-to-Noise Ratio (SNR)
  - Noise Cancellation

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## Wrapping it up!

- Look at the specs of any tech you buy.
- An audio interface will almost always result in **better quality recordings and lower latency** than USB mics.
- It is possible *right now* to have high fidelity voice lessons for free.
- All tech decisions should be considered in combination with your *goals*.



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