Part 2: Home Networking



Mike Prager Portland Audio Club November, 2017

Why computer audio?



- Play high-resolution files
- Access your music from more than one location
- Catalog your music & find it easily
- Enjoy great fidelity
- Stop accumulating physical media
- Explore something new

Why not computer audio?

- You hate computers.
- You don't have spare time:
 - Hardware & software setup, troubleshooting
 - Learning curve networking and software
 - Ripping your library
- You don't want more gear.
- You already are in audio paradise.

Two Types of "computer audio"

• #1: USB Audio

 Plays music from a computer disk to your audio system, via a USB connection

• #2: Networked Audio

- Plays music from a computer disk to your system, via your home network
- Topic of today's talk

Networked Audio: what you need

- A server program (DLNA or Roon)
- A stream receiver (renderer)
- A control point app on tablet or phone
- Disk storage for music files
- Reliable, speedy home networking
- An audio system with digital input
- A computer & software (rip, manage)
- A file-backup method

Networked audio is in flux

- What is a "streamer"?
 - A term used by magazines and retailers for any non-optical-disc-based digital audio device
- Features vary considerably
- Devices may contain combinations of Storage, Server, Renderer, DAC

Networked audio: Pro

- No computer in the audio room
- Set up one server, receive everywhere
 - Audio room, living room, bedroom, home office, exercise bike
 - Possibly over the net
- Excellent fidelity at least as good as optical discs

Networked audio: Con

- More equipment & software needed
- Can be complex to set up, troubleshoot
- Standards looser, competing, evolving
- Requires stable, fast networking

USB and Network coexist well

- Same files, tagging, storage needs, and backup systems
- Starting with USB, it's easy to add networking



About Sonos, Bluesound

- Sonos: max is 44.1/16; not for high-res audio
- Bluesound Gen 2: up to 192/24
 - USB, WiFi, Wired, Bluetooth
 - MQA
 - Marketed as "wireless speakers"
 - What Hi-Fi? Product of the Year, 2016

Do they play well with others? I don't know



Secrets of Hi-Fi and Home Theater on Bluesound Gen 2

- Elegant construction
- Seamless integration
- ... storage for giant music libraries.
- Pulse Mini [speaker] offers plenty of output and smooth sound.
- Powernode 2 [DAC/amp] has very low noise and drives difficult speakers well.

NETWORK AUDIO: EQUIPMENT AND HOOKUP (MAINLY ROON AND DLNA)

Networked Audio

Typical components

- A computer to rip CDs
- Disk storage for music library
- Reliable, speedy home networking
- A server program to send music streams
- A control point app on a tablet or phone
- A stream receiver (renderer)
- The rest of an audio system
- A backup method for your files

What's the same as USB?

- A computer for ripping
 - Software for tag editing, etc.
- File storage for the library
- A file backup plan



What's different?

- Good home networking
 - Ethernet or strong WiFi
- A server program on computer or NAS
 - Roon, JRiver Media Center, Plex
- Software to browse & control (phone or tablet)
 - DLNA: many control point apps
 - Roon, Plex: their software
- A network **renderer** (stream receiver)
 - Often a network-to-USB adapter

The Triad

Server

- Sends music file(s) as stream(s)
- Performs searches

Control point

- Controls server & renderer
- Selects music, initiates searches

Renderer

- Receives music stream(s) from server
- Outputs analog or PCM

Network audio protocols

• AirPlay (Apple): limited to 44/16

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- DLNA/UPnP: most common
 "Lingua franca" of media networking
- OpenHome: DLNA w/ upgrades
 - Linn, Auralic, some others
- Roon: RAAT
 - Works with "Roon Ready" renderers
- Plex: own protocol
 - Also supports DLNA

About Plex from heavy.com

- Pros
 - Fast and intuitive user interface
 - Easy setup
 - Can provide cover art, music videos, trailers, and more
- Cons
 - Some features require a [fee]
 - Menus might not handle large media collections well [with slow connection].

Functions and Names

DLNA and Roon

Functions	UPnP/DLNA	Roon	Location
 Send music streams Index music & run searches 	DLNA server	Roon core	PC, Mac, or NAS
Initiate searchesSelect musicControl playback	DLNA control point	Roon control	Tablet or phone
Receive music streamsOutput PCM or analog	DLNA renderer	Roon-ready output device	Audio room (feeds DAC or has one)

Note: Roon uses the same design for USB audio and network audio, while players like JR Media Center generally need additional configuration and apps to run both types of operation. The same music files can be used for all.

- JRiver Media Center is for you if...
 - Your music library is well tagged already
 - You want powerful tag editing tools
 - You want to tweak your experience
 - You have a DAC not supported by Roon
 - You want to pay less
 - You use AllMusic Guide for background on music and musicians

- Roon is for you if...
 - You value Roon's access to background on music and musicians
 - You can't be bothered with fixing tags let Roon do it!
 - You want Tidal integrated with your library
 - You want the same (idiosyncratic) interface for USB and network operation
 - Your DAC is supported by Roon
 - You don't mind paying more

- MusiChi is for you if...
 - Your library emphasizes classical music
 - You want consistent, automatic tagging
 - You don't mind using a separate DLNA server (no big deal)
 - You are happy using a product not widely adopted in the United States

• iTunes is for you if...

- You use only Apple products
- You want to sync an iPod or iPhone easily
- You don't need bit-perfect output or ripping
- You want tedious, primitive tag editing
- You prefer tags stored in iTunes, not portably
- You'll never want tags for composer, conductor, orchestra, soloists, or instrument
- You don't want to customize views
- You'll never use industry-standard FLAC files

THE TRIAD: ROON



Roon server

- Roon Core/Server running on
 - A PC or Mac
 - A NAS
 - A small computer (ROCK)

Roon control point

- Roon control, running on
 - A tablet
 - A phone
 - A computer (why would you?)



Roon renderer

- A Roon-Ready output device, e.g.
 - Raspberry Pi
 - Devices by
 - Audio Alchemy, Auralic, Ayre, BlueSound, Bricasti, Bryston, Cary, dCS, DEQX, Elac, exaSound,, Krell, Lumin, NAD, Naim, Oppo, PS Audio, Sonore, SOTM, totaldac, Trinnov, and others.
 - Others "coming soon."



THE TRIAD: UPNP/DLNA



DLNA servers

- Windows includes one (WMP)
- JRMC includes one
- Every NAS includes one
- Others
 - dBpoweramp: Asset Server (\$\$)
 - Auralic: Lightning Server (free)
 - Twonky (avoid this!)
 - I use MinimServer (free)
 - A bit techy, but excellent for searching large libraries of classical music



DLNA servers: Mike's take



- If possible, run it on a NAS or dedicated small computer that is left on.
- Configuration can be a little complex
 - But defaults are often OK
- Large classical collection? Try MinimServer
- Simplicity? Try JRiver or your NAS's server
- Does your renderer supply a server?
 - Try it, but compare others.

MinimServer config window

Server Advanced	System Packages Modules					
Enter updated values	and click Apply or OK to save changes:					
aliasTags						
alphaGroup	[albums]=200, [items]=100, Artist=100, Composer=100					
contentDir	/volume1/Music/JazzPop - +					
	/volume1/Music/Spoken-Misc - + /volume1/Music/Classical - + /volume1/Music/Radio - +					
	/volume1/Music/Podcast - +					
displayName	MinimServer [DiskStation]					
indexTags	Genre, Subgenre, -ImportWeek, Artist, All Artists, Composer, Conductor, Instru					
itemTags	People,Comment					
listViewAlbums	6					
mergeFolderAlbums	true					
tagOptions	all.ignore.sort={The},Date.indexValue.yearOnly,Album.sortTags={ImportWeek}					
tagValue						
	OK Cancel Apply					

JRiver server config window

DLNA Servers

DLNA Servers allow sharing your media with other DLNA devices on your network. You can add multiple servers with unique settings for each DLNA device on the network.

Rive	r for	Aries

Remove

Add...

... Customize views...

Display name: JRiver for Aries

Title Expression: [Album Artist]- [Name]

- Audio

✤ Mode: Original

✤ Format: PCM 24 Bit

Advanced

Images

✓ Mode: Original

- Video

✤ Mode: Specified output format only when necessary

♥ Format: MPEG2/DVD NTSC Stream

Advanced

Cancel

OK

Roon device config window

AURALIC ARIES

General	Playback		Zone Grouping	
Aax Sample Rate (PCM) Use this setting to prevent Roon from ontent above a certain sample rate.	n outputting Content that	Up to 192kHz	~	
xceeds the limit will be down-samp	led.			
Jax Bits Per Sample (PCM) Ise this setting to prevent Roon from outputting ontent above a certain bit-depth. Content that		24	~	
Acts DCD Controls Date				
lax DSD Sample Rate ets the maximum DSD sample rate for DoP. igher rate DSD will be converted to PCM.		Disabled	~	
hannel Layout				
nis setting determines now many a oon sends to your playback device re arranged.	and how they	2.0	~	
Aultichannel Mixing Strateg	3 y andles			
ifferences between the channel layout ource material and your playback device	out of the levice.	Downmix As Needed	~	
				Save Settings



Typical DLNA System

NAS running MinimServer





Some renderers (1 of 3)

- Sonore microRendu
- In: Ethernet
- Out: USB
- Cocktail Audio N15D
- In: Ethernet, USB
- Out: Analog, USB, SPDIF
- DLNA server/renderer



\$690 w/ basic power supply



Some renderers (2 of 3)

Bryston BDP3

- In: Ethernet, USB drive, internal drive
- Out: SPDIF, AES3, HDMI, USB



\$3500

- Cambridge CXN
- In: Ethernet, Wifi, USB drive, and digital ins
- Out: Analog, digital



\$750

Some renderers (3 of 3)

Raspberry Pi with DAC or digital-output board

- In: Wifi, Ethernet
- **Out:** USB plus analog or SPDIF

YouTube: Hans
 Beekhuyzen Channel

\$150 w/ DAC & basic ps



Critical: gapless network playback

- Lack of it is a pointless limitation.
 - It will disturb your enjoyment of music, sooner or later.
- Some gear still doesn't do it.
 - Most European, Japanese gear OK
 - Some American makers still miss the boat (e.g., Oppo)

Mike's take:

- Under no circumstances buy a network renderer lacking gapless playback.
- Assume nothing until you've tried it yourself.

My system: file storage, DLNA server



My system: DLNA renderer & control point



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BEYOND THE TRIAD

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Disk storage possibilities

- The disk in your computer
 - Good place to start not finish
- An audio server w/ own disk(s)
- External (USB) drive(s)
- Network-attached storage (NAS) in RAID configuration

CONCLUDING THOUGHTS

The day will come...

IT'S BEEN LOVELY BUT I HAVE TO SCREAM NOW

You Need A Backup Strategy!

Eventually every disk will fail. Back up your files often!



RAID is great, but it's not backup

- RAID (e.g., in a NAS) gives redundancy.
- It does not replace backup.
 - RAID can't fix user deletions and errors.
 - RAID can't fix malware issues.
 - RAID can't (usually) fix file corruption.
 - RAID can't help your NAS in flood or fire.
- Use RAID, but backup, too. I use a USB drive, disconnected when not in use.

Other cautions

- Manufacturers don't keep promises.
 - Ask if hardware meets your needs **now.**
 - Is software available **now** for your preferred platform?
- Choosing a configuration
 - Discs make noise keep remote if possible.
 - Avoid optical drives in costly electronics.

Other thoughts

- Computer audio can, at least, equal the fidelity you get from optical discs.
- USB audio is a great way to start.
- Home networking adds features.
- Hardware and software depend on your budget & your priorities.
 - Much free software is great; some is a pain. In many cases, a few bucks buys features and help.
 - Compared to DLNA, Roon offers much, but costs more & is less flexible.

THE END. THANK YOU.

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