building a cyber range in GCP - and - the magic of 10 meter ham radio

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Panckakescon3 backup speaker, Pancakescon4 actual speaker!

Slides at github.com/kd9cpb/slides

Who's this dude and what is a cyber range?

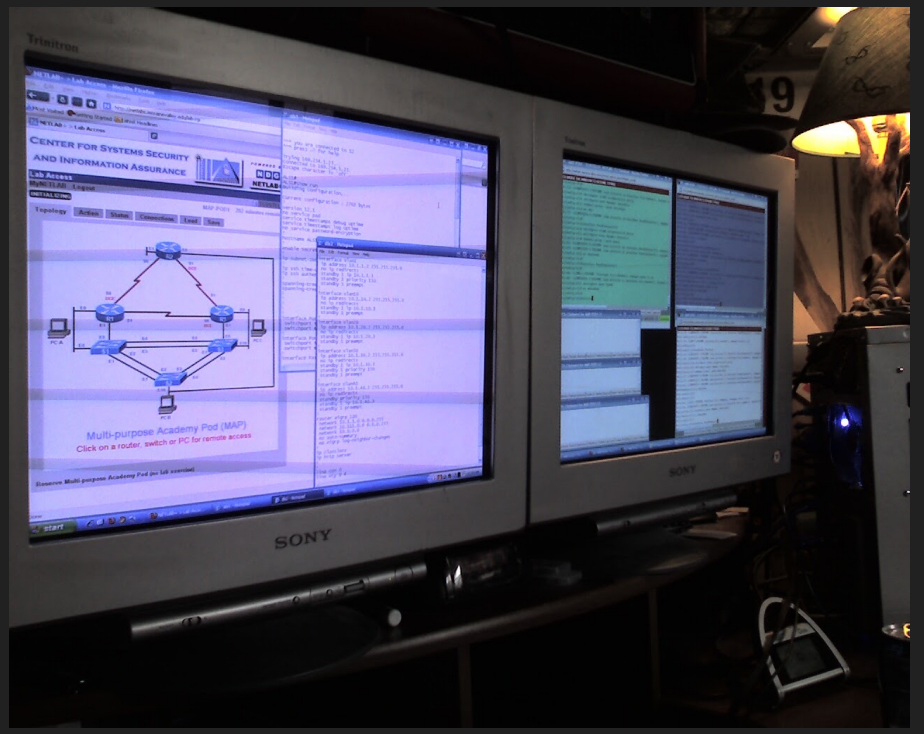
- Been into network security since DC14 + BackTrack Linux days
- Blue Team FTW
- Boring "views & opinions" disclaimer goes here

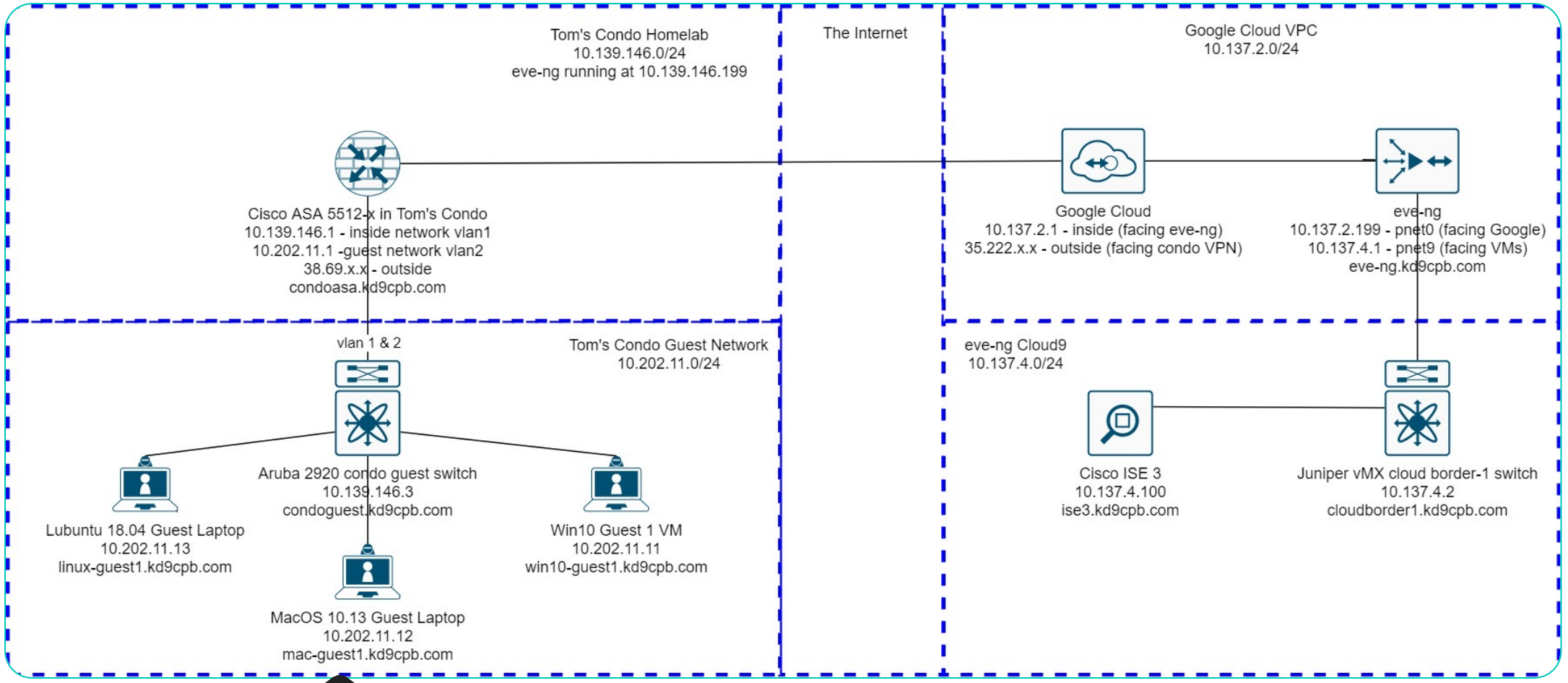
- "A cyber range is a controlled, interactive technology environment where up-and-coming cybersecurity professionals can learn how to detect and mitigate cyber attacks using the same kind of equipment they will have on the job."

- cybersecurityguide.org

Humble Cyber Range Beginnings

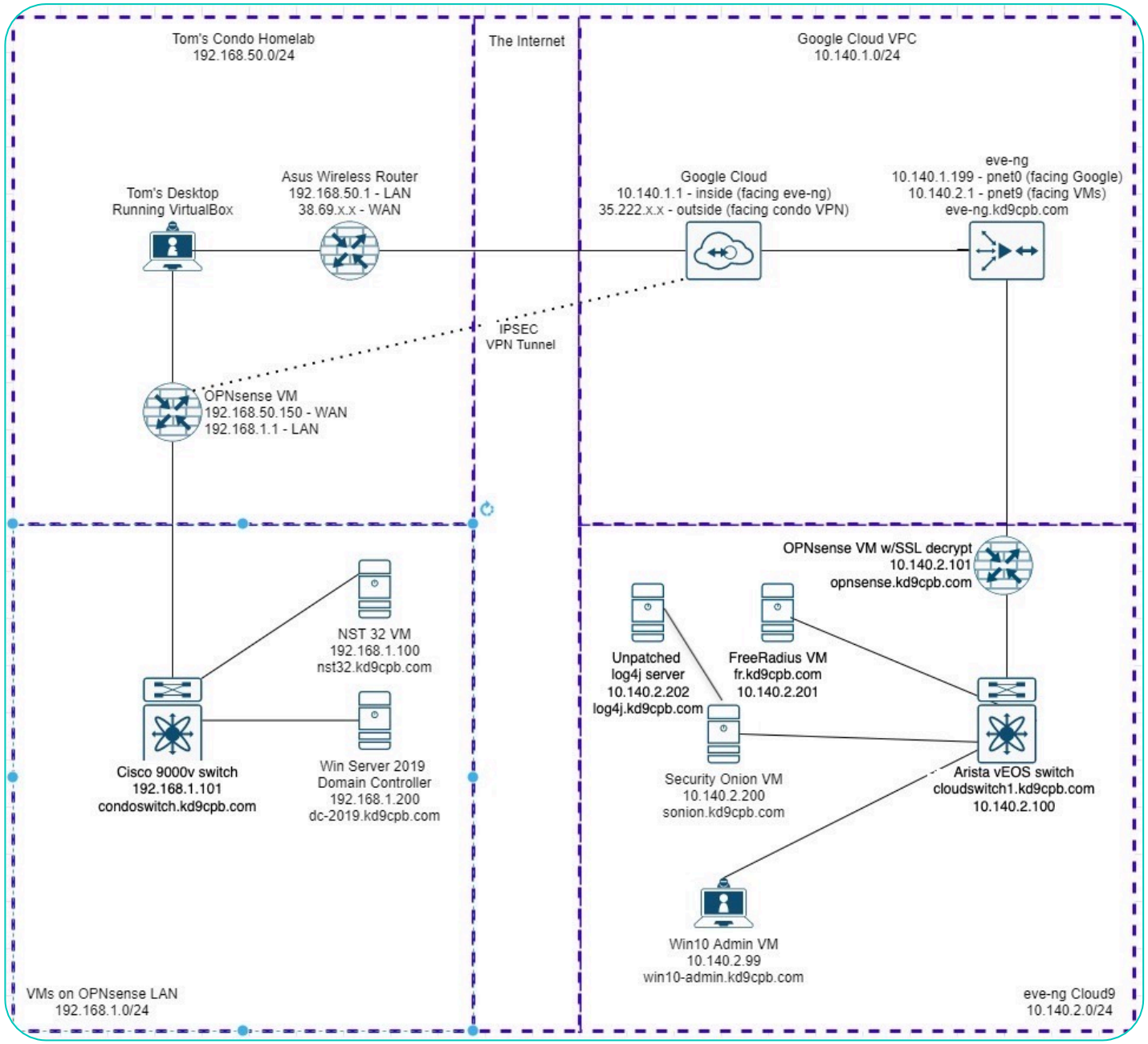
- I've been doing network security homelabs since mid-2000's, they aren't super exciting





A GCP cyber range is born

- Thanks to new gig in Summer 2020, found out about eve-ng in GCP as cyber range
- This is exciting! Can add things to home wifi that can access things in cyber range
- $300 Google Cloud New Customer Credit FTW



Doing it with free-ish stuff only

2 ways to connect btwn home & cyber range

2 different ways to BYO GCP cyberrange

- Option 1: Tony E's videos at https://youtu.be/alATWfvyJmE
- Best if you want to get running ASAP
- Just works out of the box, no messy tunneling
- This is the blue pill

- Option 2: my blog at https://kd9cpb.com/opnsense-eve-gcp
- Best if you want to really learn GCP networking
- It's messy, but you will learn a ton about cloud networks & OPNsense firewall
- This is the red pill

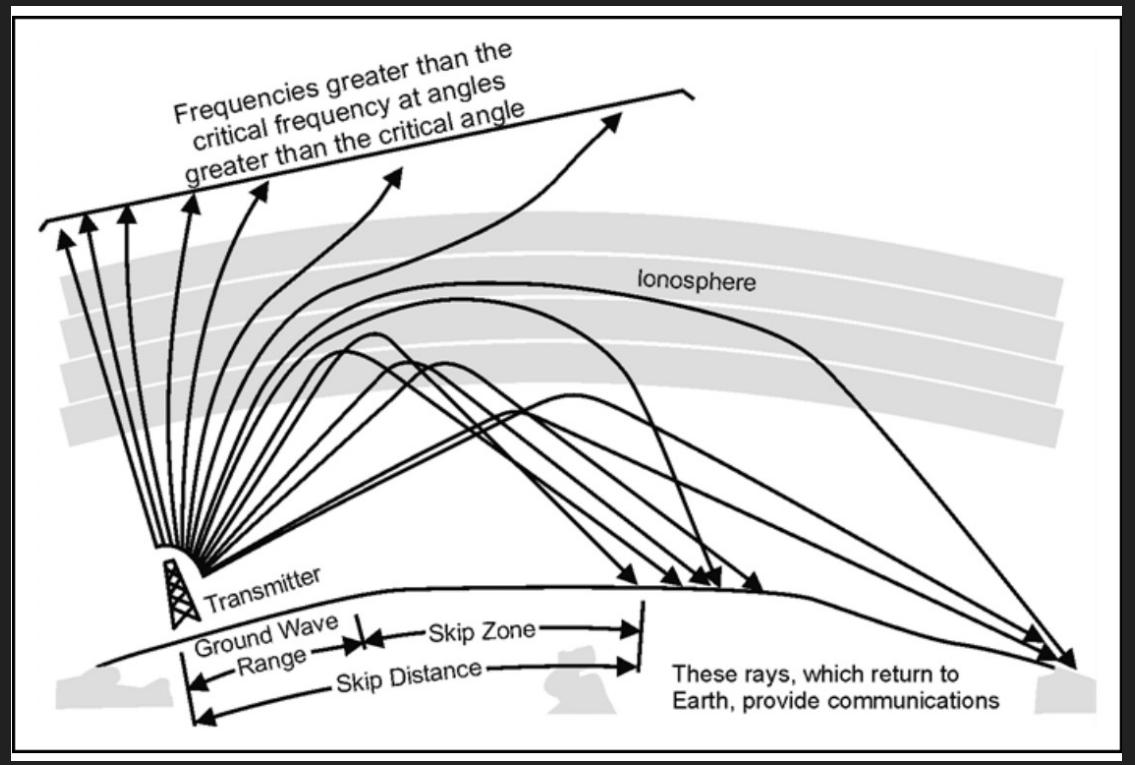
So you built a GCP cyber range, now what?

- Write your own Python/Ansible automation to do your work for you per https://kd9cpb.com/automate-gcp-eve
- See if your favorite NGFW/IDS actually detects vulns log4j, Bluekeep, etc. on an unpatched system in range
- Try different network vendor's stuff for free per https://ethancbanks.com/free-networking-lab-images-from-arista-cisco-nvidia-cumulus/
- Test if an ACL or security policy change breaks stuff without breaking things in the real-world
- Eve-ng isn't the only game in town; check out containerlab or gns3 too

Please type cyberrange Questions into Slack now before we go into radio fun!

The magical 10 meter band in ham radio

- Full story of why HF is awesome at https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN20819_ATP_6-02x53_FINAL_WEB.pdf



How do I start blasting RF into the ionosphere?

- Step 1: Get a ham radio license
- Step 2: Get a radio, antenna and adapters
- Step 3 (optional): Get WSJT-X working on your computer
- Step 4 (optional): Get QSL cards or electronic logbook

If you just want to take a listen for now, buy an SDR dongle (should be less than $50, search rtl-sdr or nooelec smart)

Step 1 option 1: Getting a license via memorization

- Either web search for "Chicago ham radio volunteer examiner" (substituting out Chicago for your town, unless you are in Chicago)
- Or do it online (proctored) via orgs like https://kl7aa.org/vec/ and https://www.w5yi.org/
- Use hamstudy.org (or similar) to memorize technician question pool

Step 1 option 2: Getting a license via studying Ria's book

- Ham radio has a diversity problem. It's gotten better since the pandemic, but still an issue
- Ria Jairam N2RJ making waves at ARRL, wrote awesome book on passing technician exam by truly understanding the fundamentals (not just memorizing!)
- Check out https://perens.com/2023/01/14/director-ria-jairam-recused-by-arrl-and-it-seems-political-to-me/ for some great ham radio drama

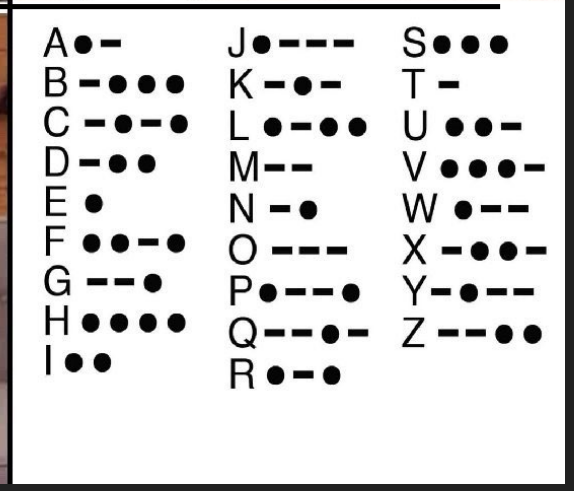
Step 2: Get a radio, antenna, adapters

- Option 1: Go cheap and get a 10 meter ham radio
- https://kd9cpb.com/10m-ft8 blabs about this, it'll cost between $150 – 450
- If you don't like it, you can put it all back on eBay at a small loss
- This is the blue pill

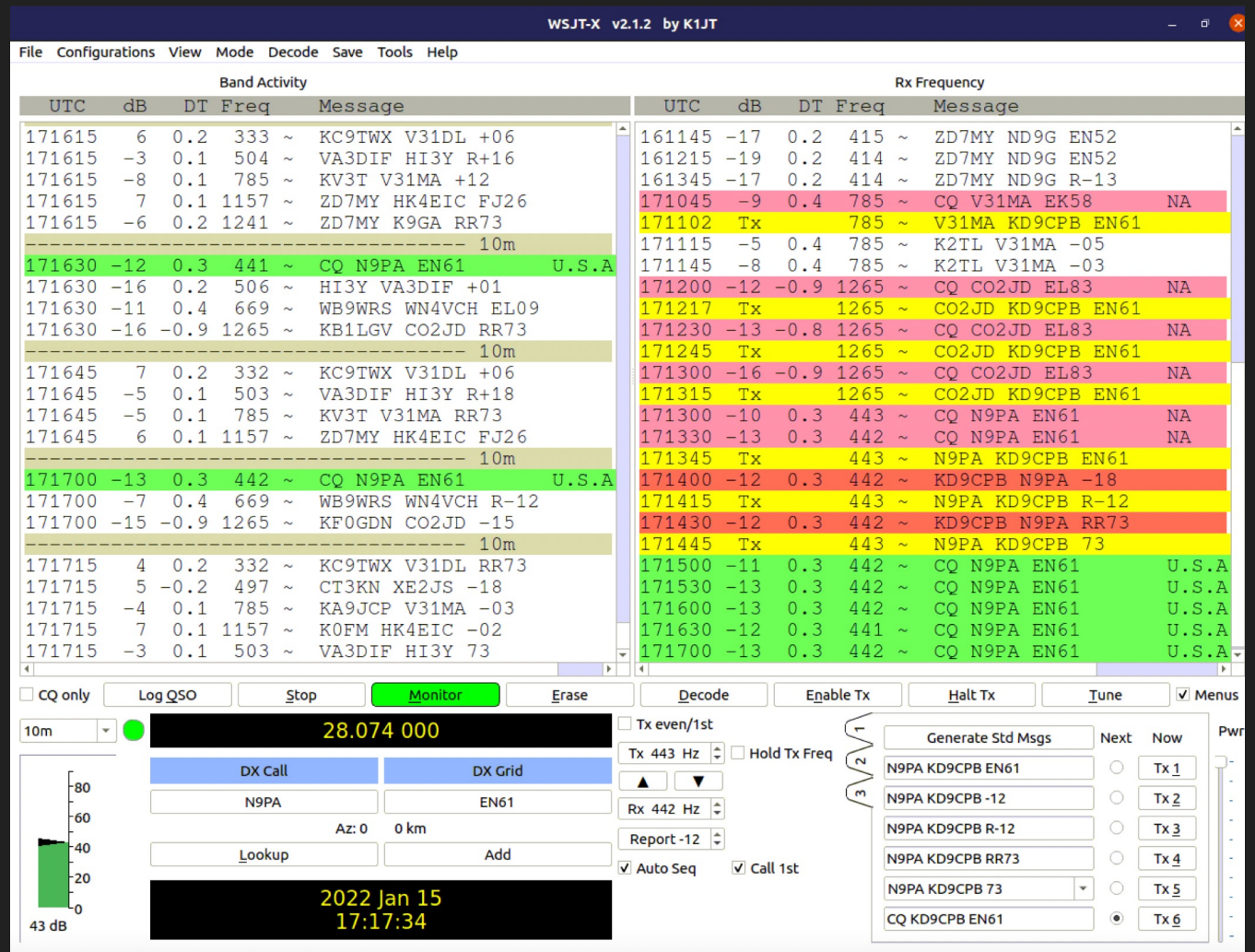
- Option 2: Go fancy with an expensive all-band HF ham radio with a tuner
- https://kd9cpb.com/g90 has my all-band setup if you're curious, $500+ to get started
- "Buy once, cry once" if you get General level license (way more studying)
- This is the red pill

Step 3: WSJT-X

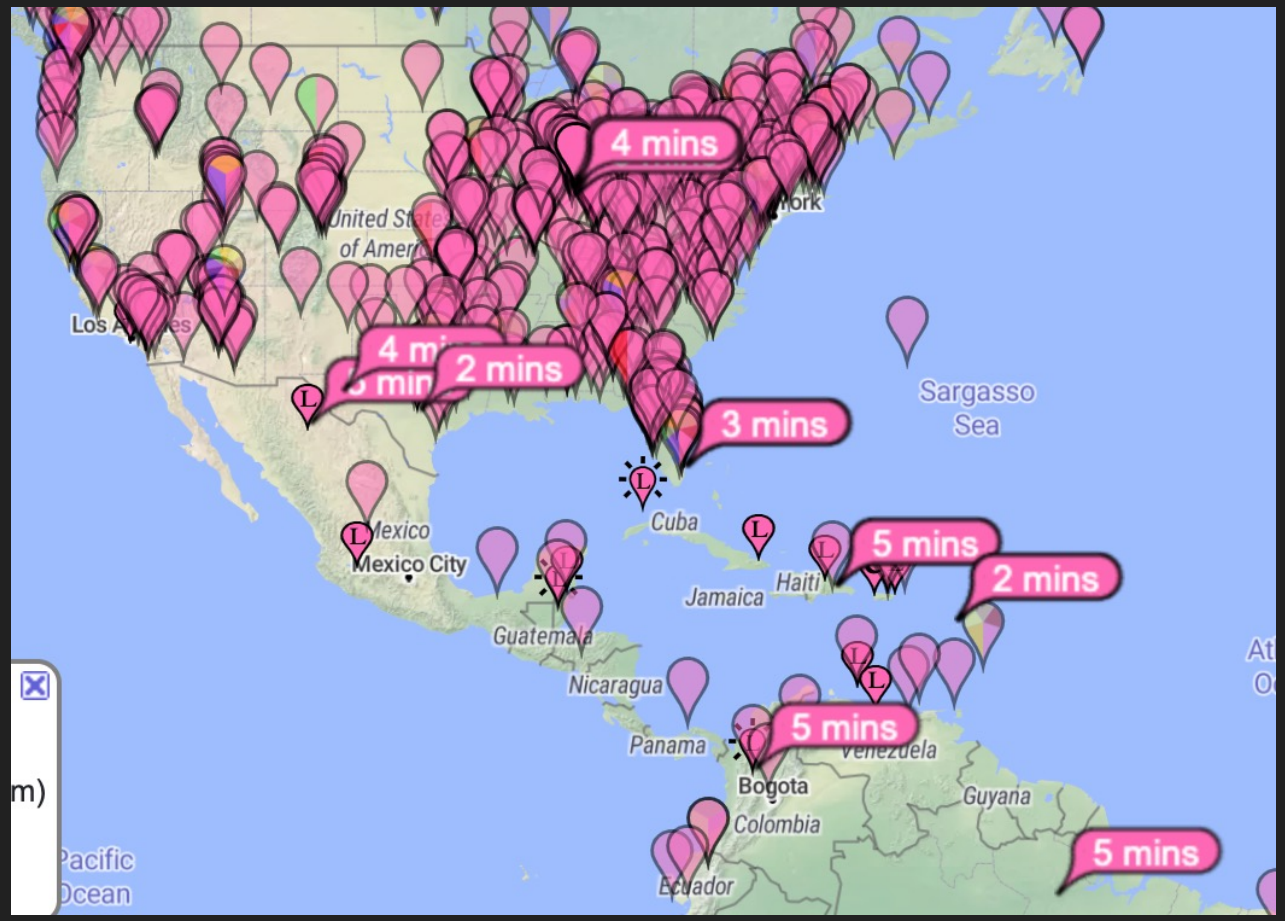
- Makes magical bagpipe noises from your computer's mic jack
- Listens for magical bagpipe noises from around the world
- When you send and receive noises, it counts as a QSO!
- Similar programs like JS8call exist to have actual conversations with the world
- No morse code required
- YouTube Tutorials are your friend

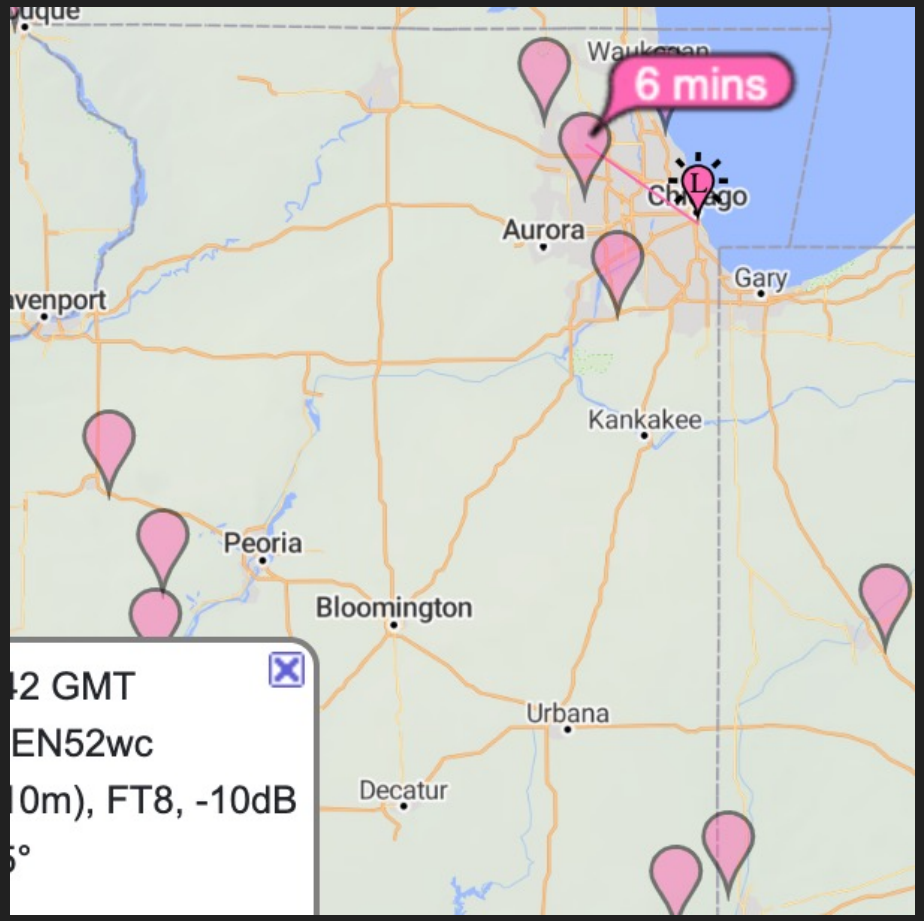


What a good 10 meter FT8 QSO looks like



Your 10 meter milage may vary





Step 4: QSL cards or electronic logging

- QSL cards are a fun hobby but not ideal for privacy
- eQSL services like QRZ, LoTW and eQSL.cc are very popular, no postage!

Serial	687446856			Log Date	2021-10-30 20:48:16 UTC
QSO Start	2021-10-30 17:45:00 UTC			Confirmed	2021-10-30 20:15:02 UTC
QSO End	2021-10-30 17:45:00 UTC			Contest	n/a
Serial	0			Serial	0
Station Class					

	QSL-TO			QSL-FROM			
Station	VP2EIH			KD9CPB			
Op	IRA HARRIS			Thomas M Costello			
QTH	PO BOX 1206 THE VALLEY, ANGUILLA British West Indies			Chicago			
State				IL			
Country (DXCC)	Anguilla			USA			
Frequency	28.074 MHz (10m)	Mode	FT8	28.074 MHz (10m)	Mode	FT8	
Power	0 W	RST Rcvd	-15	10 W	RST Sent	-12	
Coordinates	18.229351 N, -63.047791 W			41.713314 N, -87.756652 W			
Grid	FK881f	Distance	3507km (2179 mi) @ 131°	EN61cr91	Distance	3507km (2179 mi) @ 311°	

Last slide I promise

- Thanks for watching! Slides at github.com/kd9cpb/slides
- Seriously after Pancakescon consider spending your $300 free GCP credit on building a cyberrange
- Then spend $300ish real money on 10 meter ham radio gear after the GCP credit runs dry ☺
- Hit me up @kd9cpb@infosec.exchange or qrz.com
- Have a nice day!