#OPENPIPES

Building Community Owned Critical Infrastructure

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openpipes.net

$ whoami

- Started in the internet industry end of the 90s, mostly coding (in C)
- Moved to Chicago ~2005, built a couple futures trading companies
- Founding director of PeeringDB, helped establish it as an independent Non profit organization
- Served on many Non profit boards
- Created and built out United IX / Chicago Internet Exchange
- $dayjob focused on AI tooling and infrastructure at scale
- volunteering on Open Pipes and Global Peering Forum

What will we talk about?

- Community owned critical infrastructure
- Our model, allowing community governance
- Knowledge base and practical application
- A repeatable launch playbook — use ours, or make your own
- Lessons from building one in Chicago right now
- Open Pipes Mentor Network

Deja Vu?

I did start one other IX in Chicago...

The technology was achievable. Building trust, participation and sustainable governance was harder.

https://chinog.org/wp-content/uploads/2015/05/Middle-Out-Automation-Automating-an-IXP.pdf

Why?

Critical Infrastructure is too important

Regardless of the current owner, if it's commercial, it can change too easily

I used to argue private ownership was better for initial control,

I was wrong.

Trip down memory lane

NLNOG Infrastructure started here at Pepper Canister during NANOG67

Up and Running by NLNOG Sept 2016

https://nlnog.net/events/past-events/nlnog-day-2016/presentations/7_NLNOG_infrastructure.pdf



FUN FACT · BONUS STAGE

Won `157.97.97.0/24` for 1st at The Merciless NLNOG Quiz.

Nobody wants to be first

- The real work is not in installing a switch:
- Proving there is genuine local demand
- Aligning networks, facilities and other stakeholders
- Securing the first members
- Turning interest into live connections
- Every new IXP must solve this bootstrapping problem.

An IX is sticky

Cross-connects

BGP sessions / Route policy

Meaningful traffic

Peering relationships

Capacity plans

Operational trust

By design. **A fabric you can leave casually isn't doing its job.**

Commercial ownership permits operator and member incentives to diverge.

IX redundancy is good

DIVERSITY

Operators

Facilities

Paths

BONUS

New peers

Peer overlap is redundancy

Maintenance drain is “free”

Connect to multiple IXes. Regardless of who runs them.

More IXes in a metro means more resilience for everyone.

The Open Pipes nonprofit model

Global organization umbrella

Handles legal and taxes

501(c)(3) RECEIVED

Setup to help communities and allow self governance

Protect assets as fabrics change

What that means, structurally.

ASSETS

No Wind down

No wind down unless the fabric isn't being used

GOVERNANCE

Community driven

The networks plugged in vote on the future of the fabric. Voting structure being finalized.

SURPLUS

Stays in the fabric

No dividend stream. Money earned at the fabric pays back into the fabric.

How: Governance stays local

local region creates self governing committee

No extra overhead for taxes, filing

Keeps the building local with network engineers

Neutral body to separate from local DCs

*lots of people have expressed interest, ***not proven yet***

From model to playbook

Repeatable.

How does a community turn local interest into **a working, sustainable exchange?**

Find the right conditions

A genuine interconnection problem

Networks willing to join the conversation

Accessible fiber and transport

Local people willing to lead

A realistic path to future expansion

Demand leads the deployment, ***not the other way around.***

Promote the outcome, not the port

Lower barriers to interconnection

Better local resilience

More direct traffic exchange

Greater operator choice

A stronger technical community

Publish an honest roadmap. Share progress. ***Make joining easy.***

Reward the first movers

Nobody wants to be first — founders take that risk

Their names convince the next ten networks

So make founding mean something:

Founder badge · Challenge coin · Vanity IP

Recognition costs little and means a lot.



Keep operations practical

New tech has collapsed the cost floor

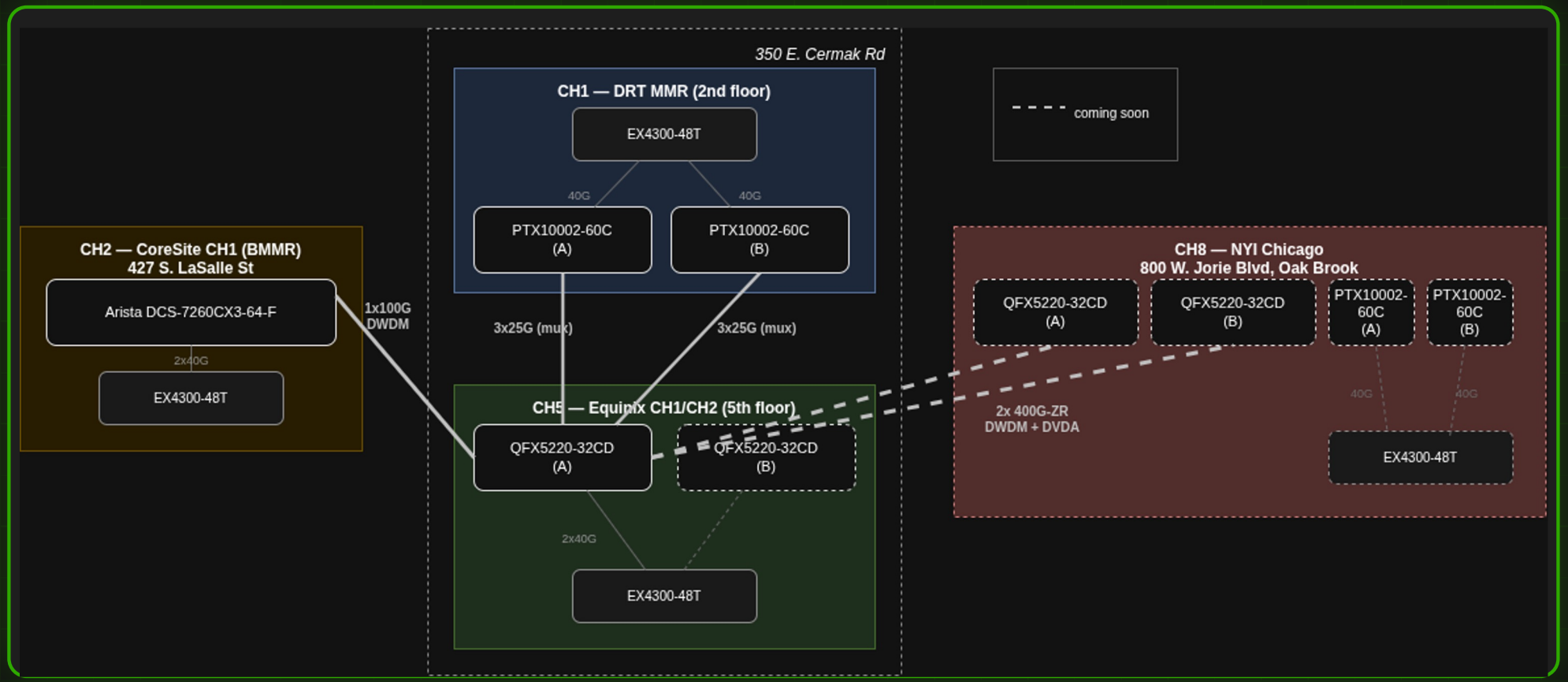
Purpose-built beats enterprise-priced

Open source over license fees

If the community can’t maintain it, it won’t last

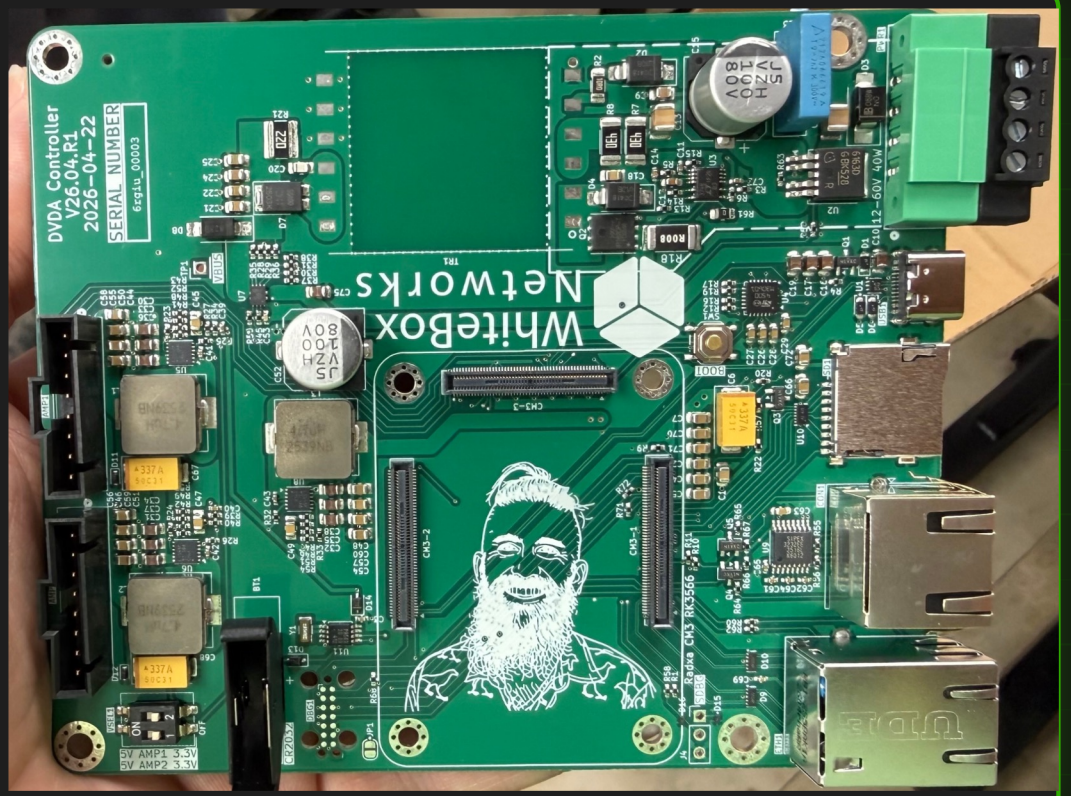
Cheap isn’t the compromise — ***it’s the strategy.***

Day-one topology (SPOFs and all)



New Amps

- Low Cost
- Dual EDFA Amp
- Built for Open Pipes



Out of Band

- Isolated per pop
- OpenWRT (GL-MT3000)
- LTE, WIFI, ETH
- Serial + ETH mgmt
- Wireguard phone home



Automate from day one

FullCtl for automation layer (https://github.com/fullctl)

NetBox for DCIM (https://github.com/netbox-community/netbox)

oob is OpenWRT + wireguard

All open source — use them, or build your own

VLANs are “free”

INTRA-IX

Connections between fabrics

Here’s why you want routers

CACHES

Cache services & servers

Meaningful traffic from day one — the “nobody wants to be first” answer.

TRANSPORT

Transport, etc

Partner with local providers.

BUT WAIT, THERE'S MORE?

$your_service_here

Spare VLANs make experiments cheap.

Peering starts the fabric. **Services are why members stay.**

Make joining achievable

Interest — understand the network's goals, locations, constraints

Feasibility — confirm access, transport, costs, timescales

Connection plan — agree responsibilities, requirements, dates

Onboarding starts ***before the port is ordered.***

From turn-up to participation

Configuration — clear templates, route-server info, support

First traffic — validate sessions, routes, monitoring together

Participation — introduce peers, communication, governance

…and it continues ***after BGP is up.***

Fully automated onboarding

1. Type an ASN, pick a port
2. Portal invite, config templates, route-server info — automatic
3. Peer

Volunteer time is the scarcest resource.

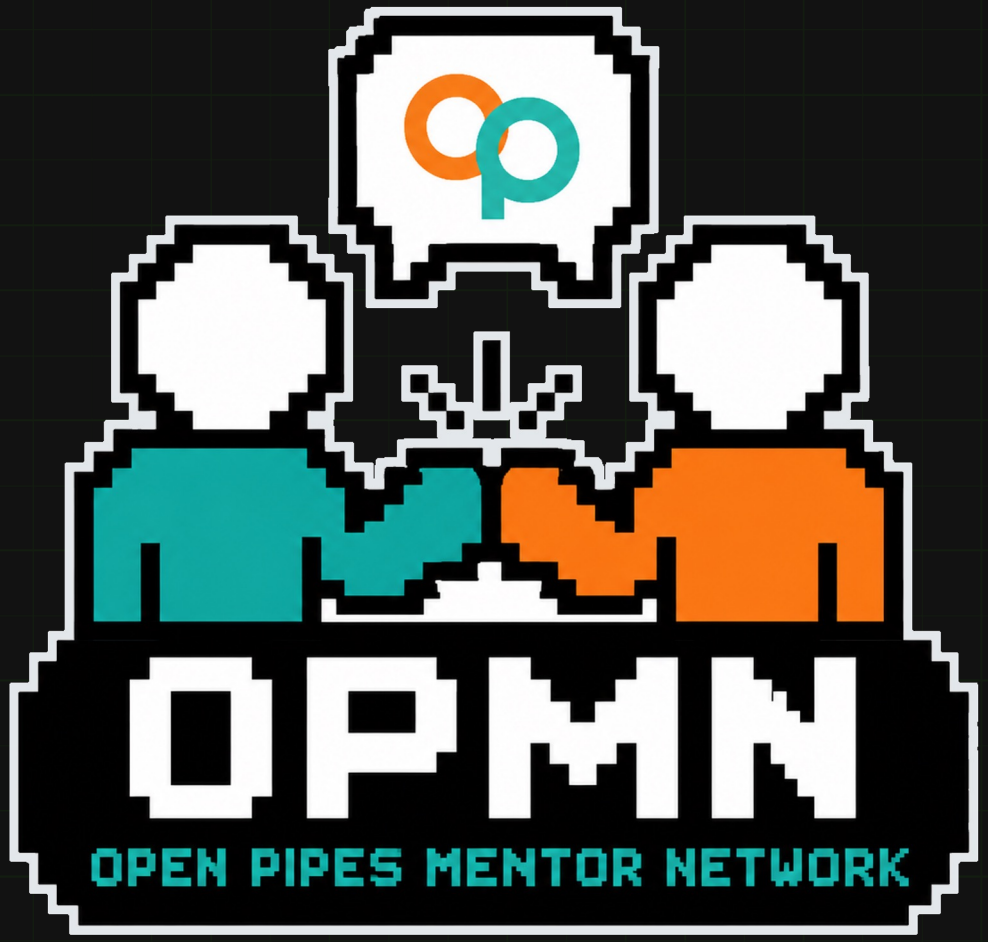
If onboarding needs a hero, it won’t scale.

Open Knowledge for Communities

- The playbook you just saw, written down
- Tribal knowledge, documented
- Public, versioned, contributable
- Best Current Operational Practices
- Use ours, or fork it.

https://openpipes.net/docs

Open Pipes Mentor Network



People are part of the infrastructure

It takes people who know how to:

Read whether the conditions are right

Convince the first network to connect

Set up governance that lasts

Make tech choices cheap and practical

Get a member to first traffic

The playbook is documented. ***The judgment isn't.***

Meet the Open Pipes Mentor Network

People who need experience, meeting people willing to share it

Communities building or growing an IXP

Networks connecting to their first exchange

Newcomers entering the operator community

Veterans who want to give back

Every step of that playbook ***has someone in this room who's done it.***

Run by Bijal Sanghani

25+ years in Internet infrastructure and community building

Euro-IX · RIPE community · PeeringDB board

Now Managing Director of Open Pipes

Say hi: ***bijal@openpipes.net***

Finding the right person is luck

Communities are larger than ever

Conferences are bigger

People are spread across the world

Knowledge is locked in a small number of heads

The right mentor happens by chance

The experience exists. ***The connection doesn’t.***

Think you have the right conditions?

Tell us where you are — idea, planning, or stuck

We match on needs, skills and experience

Real introductions, not a directory

From one question to long-term mentorship

Or not sure you do? ***We'll find you help.***

You’ve already done this

You launched the fabric

You convinced network #1

You walked someone to their first BGP session

An hour of your judgment saves a community six months

We all used favors once. *Pay them forward.*

Built around trust

Verified participants

Community validation

Human moderation where it matters

Safe, supported introductions

Matching on needs, skills and experience

Start with trusted relationships. ***Add technology where it helps.***

What we’re building

Mentor and mentee profiles

Automated matching in a trusted community

Conference Buddy program

Leadership and career mentoring

Technical mentoring

Possible features — ***you tell us what to build first.***

Would you use it?

Would you volunteer as a mentor?

Would you have used this, early on?

What would make it valuable?

What would stop you using it?

What should we build first?



Help us shape the next step. ***hello@openpipes.net***


1UP
lmer.ai
Survey
Questions
?
Want to get involved?
hello@openpipes.ne
t