DWeb Social + Community Impact

Miro Board

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Learning Outcomes

- How to define the criteria against which one would design a community network.
- How to organize a community network and define roles.
- How to begin designing a community network taking technical and social requirements into consideration.

Having a community-built mesh network can be beneficial on several levels. Community networks offer the advantage of being built and maintained by people with a vested interest in accommodating and catering to whomever will be using the network. It also offers opportunities for members of the community to receive technical training in network engineering and infrastructure maintenance, web design and development, and to also give back by working as trainers or hosting network infrastructure within their homes. Community networks can also be a source of shared pride and social bonding over a shared effort that benefits everyone involved.
In this session, we will review examples of community networks from around the world created by and for folks from all different backgrounds, interests, and movements. We will also discuss how networks can be designed from the ground up, not just from a technical perspective, but also in terms of content, language and iconography offered on the community network platform.
What does it mean to critically think about creating a dweb project?
What blindspots exist in social projects (what bad stuff people can do)?
Decentralized protocols enable community self-determination while maintaining broader network connectivity. It's also a great example of how technical federation can support social federation - allowing diverse communities to coexist while still being able to communicate across boundaries.

From https://altermundi.net/documentation/planning-a-free-and-community-network/

- What causes have motivated the construction of a free and community network?
- How many people live in the community?
- Who would use the network and for what purpose?

- An estimated census of age brackets, gender or other relevant characteristics can also be undertaken.
- It is important to consider whether a particular condition such as seasonal work activity causes the community population to grow or fall abruptly, depending on the time of year.
- What labor activities predominate in the surrounding area and how could the existence of the network affect them?
- Are there any recurring threats?
- Who takes part in the network, and what usage and access do they have to technological devices?
- According to previous experiences in other projects, what level of social commitment exists within the community?

Components of a DIY network

- ## Applications
  - ### Communication Protocols (similar to HTTP)
    - AT protocol aka "ATProto", Authenticated Transfer protocol
      - is a protocol and open standard for distributed social networking services.[3] It is under development by Bluesky Social PBC, a public benefit corporation originally created as an independent research group within Twitter, Inc. to investigate the possibility of decentralizing the service.[4]
      - The AT Protocol aims to address perceived issues with other decentralized protocols, such as user experience, platform interoperability, discoverability, network scalability, and portability of user data and social graphs.[3
      - As opposed to a peer-to-peer model between end devices, it follows a federated model that was chosen to ensure the network is convenient to use and reliably available. Repository data is synchronized between servers over standard web technologies (HTTP and WebSockets).
    - Git (distributed version control)
      - is a distributed version control system that tracks changes in files and coordinates work among multiple people.
      - Each developer has a complete copy of the project history, it works offline and syncs once back online. Can work in a p2p setting, but since github and gitlab are the most popular web interfaces, it feels centralized.
    - IPFS aka InterPlanetary File System
      - IPFS was created by Juan Benet, who later founded Protocol Labs in May 2014

        - The InterPlanetary File System (IPFS) is a collection of protocols that facilitates the decentralized storage and retrieval of files and content. It uses a content-based addressing scheme, relying on unique hash-based Content Identifiers (CIDs) to identify and access data.
        - it is also referred to as a hypermedia, peer-to-peer (P2P) network for distributed file storage and sharing.
    - DAT / Hypercore
        - is a peer-to-peer protocol for sharing and synchronizing data, originally developed by the Dat Project.
        - Often used for scientific data sharing, archives, collaborative documentation. Kind of like the git for data.
    - Matrix
        - A set of open APIs for decentralised communication, good for securely publishing, persisting and subscribing to data over a decentralized global federation of servers. Uses include Instant Messaging (IM), Voice over IP (VoIP) signalling, Internet of Things (IoT) communication, and bridging together existing communication silos - providing the basis of a new open real-time communication ecosystem.
    - Scuttlebutt
        - is a protocol for building decentralized applications that work well offline and that no one person can control. Because there is no central server, Scuttlebutt clients connect to their peers to exchange information.
    - mosquitto from Eclipse Foundation
        - An MQTT message broker that enables communication between clients and IoT devices using the MQTT protocol. It follows the publish-subscribe (pub/sub) messaging model, which works like this: The broker receives messages from publishers, verifies their publishing rights, and queues messages to be sent out. It then identifies authorised subscribers connected to the broker and routes the messages to subscribers who are subscribed to a publisher's topic.
    - Zerotier encryption layer
        - ZeroTier is a secure network overlay that allows you to manage all of your network resources as if they were on the same LAN. The software-defined solution can be deployed in minutes from anywhere. No matter how many devices you need to connect, or where they are in the world, ZeroTier makes global networking simple.
- **Platforms**
    - Yunohost

        - YunoHost is an **operating system** aiming to simplify **server administration** and therefore democratize self-hosting while making sure it stays reliable, secure, ethical and lightweight. It allows you to install and maintain - **with very little technical knowledge** - digital services (apps) **that you control**.
    - NextCloud
        - fully open-source, on premise content collaboration platform. Teams access, share and edit their documents, chat and participate in video calls and manage their mail and calendar and projects across mobile, desktop and web interfaces.
- ## Document creation and management
    - NextCloud Office
        - Nextcloud Office lets you edit documents, spreadsheets, presentations and drawings and can read and write all major document formats like DOCX, PPTX and XLSX as well as a wide range of open formats. All these documents can be edited collaboratively or alone and from mobile or the browser interface.
    - Etherpad
        - **Server-based** but self-hostable collaborative document editing
        - "Bring the server home" - community-owned infrastructure
    - PeerPad
        - "Eliminate the server" - pure peer-to-peer collaboration
        - **IPFS-based** - runs entirely in web browsers
        - **No servers required** - documents stored on IPFS network
        - **Direct peer connections** - collaborators connect directly to each other
        - **Content-addressed** - documents identified by cryptographic hashes
    - CoBox (DAT based cloud)
        - CoBox wants to facilitate a transition away from giant data centers, huge storm clouds, towards a vision of cloud infrastructure that is light, distributed, and importantly, is offline-firstSyncthing
    - Radicle
        - is a peer-to-peer code collaboration platform that serves as a decentralized alternative to GitHub/GitLab. It builds a networking layer on top of git that uses a gossip-based replication protocol for syncing code and metadata
        - It demonstrates how DWeb principles can be applied to developer workflows, making it a great case study for showing how decentralization isn't just about social media - it can transform how communities collaborate on technical projects and knowledge sharing.
- ## Social applications

- Element chat client (formerly called Riot.fm)
  - Built by the creators of Matrix protocol
  - is designed to be a user-friendly interface for Matrix's decentralized communication protocol. It supports end-to-end encryption, federation across different servers, and bridges to other communication platforms.
- meshtastic channels (can work offline)
  - Meshtastic® is a project that enables you to use LoRa radios as a long range off-grid communication platform in areas without existing or reliable communications infrastructure.
  - When you send a message on your Meshtastic companion app, it is relayed to the radio using Bluetooth, Wi-Fi/Ethernet or serial connection. That message is then broadcasted by the radio.
- Briar chat client (can work offline)
  - Briar is a messaging app designed for activists, journalists, and anyone else who needs a safe, easy and robust way to communicate. Briar doesn't rely on a central server – messages are synchronized directly between the users' devices. If the Internet's down, Briar can sync via Bluetooth, Wi-Fi or memory cards, keeping the information flowing in a crisis. If the Internet's up, Briar can sync via the Tor network, protecting users and their relationships from surveillance.
- Secure Scuttlebutt - Patchwork, Manyverse, etc (offline first)
  - **Patchwork is a Desktop client** for SSB (Windows, Mac, Linux) that resembles a traditional social media feed interface. It shows posts, replies, and social interactions in a familiar format and is good for longer-form posts and discussions
  - **Manyverse is a Mobile client** for SSB (Android, with iOS development) with a streamlined, mobile-optimized interface. It focuses on peer-to-peer connections via local WiFi, Bluetooth, and internet.
- Mastodon
  - is a decentralized microblogging platform that's an open-source alternative to Twitter/X. It runs on the ActivityPub protocol, and is a federated collection of servers run by groups and individuals.
  - Supports local governance

Infrastructure

Communication protocols

- WiFi 802.11

        - It specifies the technical rules for how laptops, phones, and other devices connect to wireless routers and access points to share internet and communicate with each other - essentially the "language" that all WiFi devices use to talk to each other over radio waves.
        - Unlike LoRa which is designed for long-range, low-power communication, WiFi 802.11 is optimized for high-speed data transfer over shorter distances
    - LoRa
        - LoRa is a modulation technique, specifically a chirp spread spectrum modulation, used for long-range, low-power wireless communication.
        - **LoRa** = the telephone wire
        - **Meshtastic** = the phone system that routes calls through the network
    - BATMAN adv (mesh)
        - **BATMAN-adv** (Better Approach To Mobile Adhoc Networking - advanced) is a mesh networking protocol that automatically connects multiple WiFi devices into a single, seamless network without needing a central router.
        - was developed by the **German Freifunk community**, which is a grassroots wireless community networking movement.
        - It runs "underneath" regular network applications, making a bunch of separate WiFi routers and devices act like one big network - so you can walk around a neighborhood with BATMAN-adv nodes and your device stays connected as it automatically hops from router to router.
        - Unlike regular WiFi where you connect to one specific router, BATMAN-adv creates a "network of networks" where every device helps route traffic for everyone else, making it perfect for community mesh networks where neighbors want to share internet and stay connected even if some routers go offline.
- ## Platforms
    - OpenWRT
        - OpenWrt represents **digital sovereignty at the hardware level** - instead of being limited by what Linksys or Netgear thinks you should be able to do with "your" router, communities can take full control of their networking infrastructure.
        - It's a great example of how open-source software enables community self-determination in network infrastructure.
    - LibreMesh
        - LibreMesh is "a modular framework for creating OpenWrt-based firmwares for wireless mesh nodes" that allows "simple deployment of mesh networks.

        - The LibreMesh project (LiMe) was started in 2013 by a set of free network activists from several cultures and different projects around the world, willing to create a common solution for the deployment of free mesh networks
    - **Routers**
        - TP-Link TL-WR902AC
        - LibreRouter
            - is a purpose-built, open-source hardware router specifically designed for community mesh networks, originating from Argentina's community networking movement.
            - it is designed for community networks that are organized by a group of people such as neighbors in order to share local and other content without a profit motive"
            - **From AlterMundi** is an Argentina-based NGO that has become one of the world's leading organizations in community mesh networking, pioneering both the technical tools and the community organizing models that have inspired similar movements globally.
        - Raspberry Pi
        - Heltec v3 ESP32
            - with LoRa, Wifi, Bluetooth
        - gl-mt300n-v2
    - **Antennas**
        - TP-Link TL-WN722N
        - TP-Link TL-WN3200 dual band
    - **Data Storage**
        - External drives
        - SD cards
        - Network drives

Case Studies

- **Hunts Point NYC**
    - Since 2017, the Hunts Point Community Network (formally the Free Hunts Point Community Wifi Mesh Network) has offered a free wireless Wifi mesh network for the Hunts Point community that is resilient, community-owned and managed by local residents and businesses.
    - The HPCN is the first and only mesh network in the South Bronx that provides free Wi-Fi before, during and after a climate emergency.

- Based in the Hunts Point peninsula, the network is operated by local business and residents that are trained to install and maintain the network that currently offers up to 600 individuals free Wi-Fi throughout the month.

Rhizomatica - HERMES

- High-frequency Emergency and Rural Multimedia Exchange System
- HERMES, provides affordable digital telecommunications over shortwave/HF radio using a simplified visual interface accessible via smartphone or computer, allowing for the transmission and reception of data (chat, audio, documents, photos, GPS coordinates, etc). For security, this information can be easily encrypted and password-protected by the sender. HERMES, both architecture designs and software, is free and open-source.

SysterServer

- Syster Server offers services to its network of feminist, queer and antipatriarchal folks. The syster server is run by feminists, using FOSS. It acts as a place to learn system administration skills, host services and inspire others to do the same.
- Services and sites we host in our servers:
  - Nextcloud
  - Gitlab
  - Mastodon
  - Mailing lists
  - A peertube instance
  - Technical docs
  - VPN zines
  - /etc -- eclectic tech carnival

Detroit Digital Justice Principles

- To develop the principles that would guide our work, the DDJC conducted a series of interviews amongst our founding members.
- The interviews explored how coalition members were using media and technology for community organizing or grassroots economic development and to describe their vision for “digital justice” in Detroit. We developed the following digital justice principles from common themes that emerged in these interviews.
  - **Access**
    - Digital justice ensures that all members of our community have equal access to media and technology, as producers as well as consumers.
    - Digital justice provides multiple layers of communications infrastructure in order to ensure that every member of the community has access to life-saving emergency information.

        - Digital justice values all different languages, dialects and forms of communication.
    - **Participation**
        - Digital justice prioritizes the participation of people who have been traditionally excluded from and attacked by media and technology.
        - Digital justice advances our ability to tell our own stories, as individuals and as communities.
        - Digital justice values non-digital forms of communication and fosters knowledge-sharing across generations.
        - Digital justice demystifies technology to the point where we can not only use it, but create our own technologies and participate in the decisions that will shape communications infrastructure.
    - **Common ownership**
        - Digital justice fuels the creation of knowledge, tools and technologies that are free and shared openly with the public.
        - Digital justice promotes diverse business models for the control and distribution of information, including: cooperative business models and municipal ownership.
- ## Solar Protocol
    - The Solar Protocol network reconfigures internet protocols using a kind of natural rather than artificial intelligence.
    - The network routes internet traffic according to the logic of the sun, where page requests are sent to whichever server is enjoying the most sunlight at the time. We are working with people around the world who have built and installed servers that host this site alongside their own web content. When their server becomes the active node of the network, their online materials (if any) will soon become visible on this site.