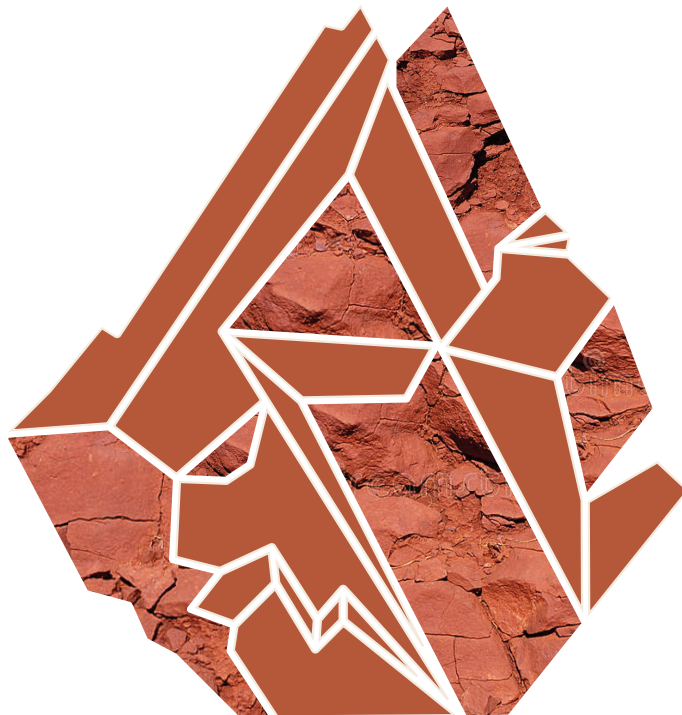# RED ROCK

WIFI

PROJECT

RED ROCK

WIFI

PROJECT

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Multi-Disciplinary Design
University of Utah
DES 3520-001 Design Product Studio 2
Tsoutsounakis
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In partnership with Rural Utah Project

The Red Rock WIFI Project fosters a sense of community among residents and reciprocity from visitors through a locally created mesh WIFI network in San Juan County.

The Red Rock WIFI Project aims to create a platform of mutuality though data connection where an internet service is provided for the people, by the people

CONTENTS

REBECCA LIOU x RUP

WIFI FOR THE PEOPLE, BY THE PEOPLE
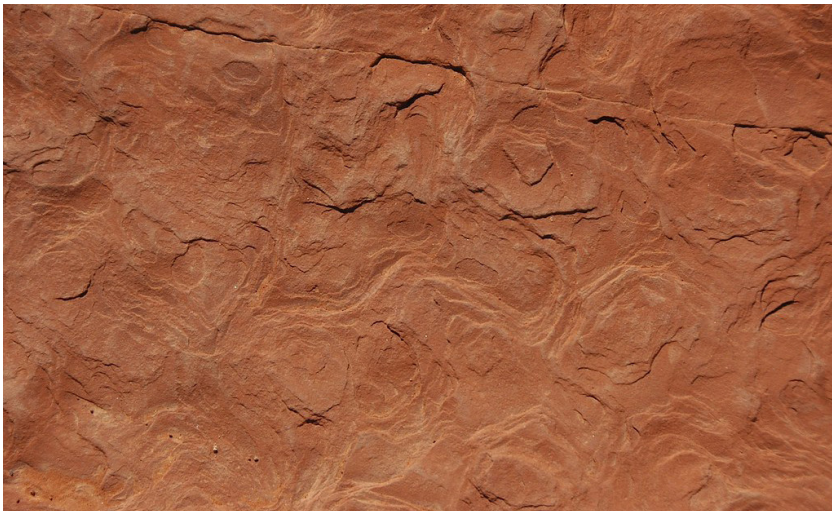
"Interference ripples, Moenkopi Fm. redbeds (Lower Triassic), Goosenecks Point along Sulphur Creek, Capitol Reef National Park, southern Utah 2" by James St. John is licensed with CC BY 2.0.
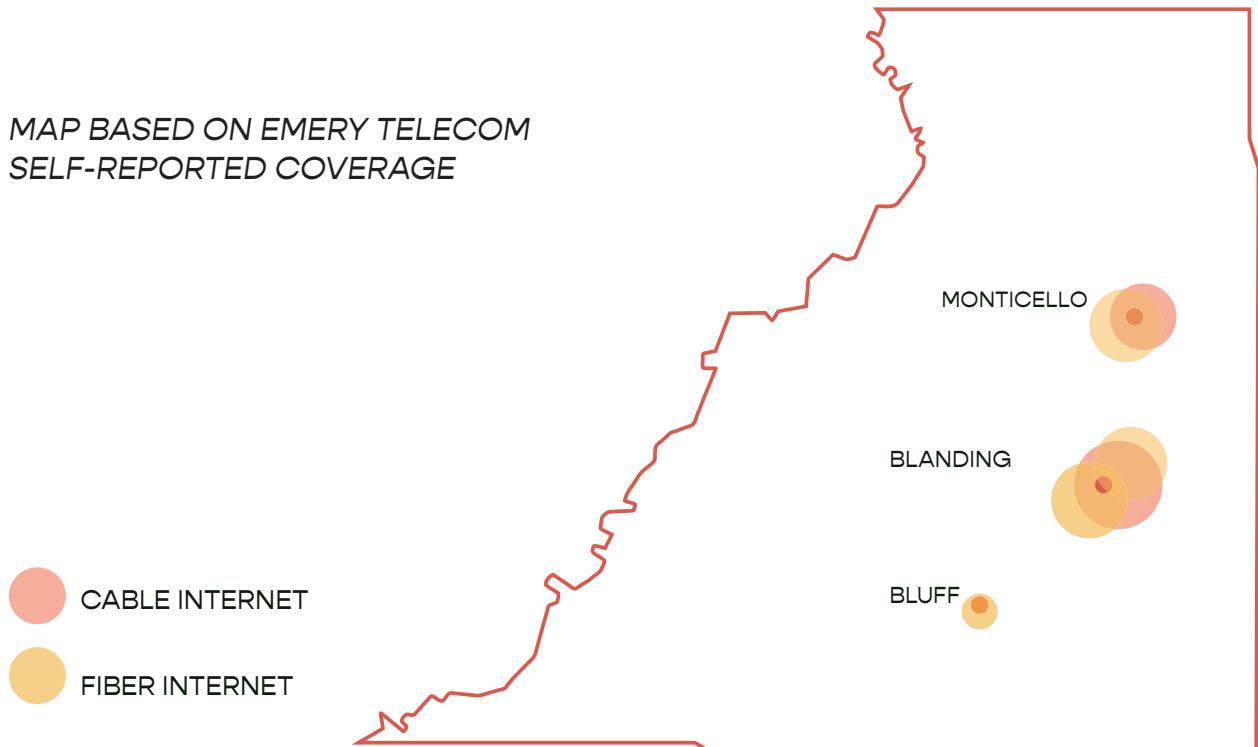

Digital Divide

The Digital Divide "refers to the growing gap between the...portion of the population who do not have access to computers or the internet; and... Americans living in urban and suburban areas who have access" (Computer Science Department Stanford University, n.d.).

In it's simplest definition, the Digital Divide refers to the increasing gap that exists between those who have reliable internet access and those who do not. These gaps of connectivity and access are prominent across rural areas of the United States.

MAP BASED ON EMERY TELECOM
SELF-REPORTED COVERAGE

MONTICELLO

BLANDING

BLUFF
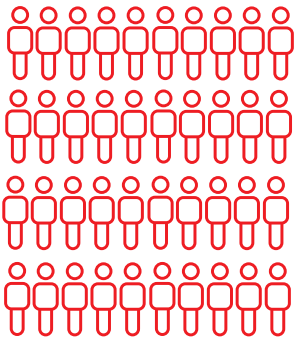
CABLE INTERNET

FIBER INTERNET

Municipal Broadband in San Juan County

The Digital Divide continues to be widened by the large data companies such as Comcast and AT&T, but also through state legislation. Utah is one of eighteen states with strict legislation regarding municipal broadband. Utah legislature imposes procedural and accounting requirements on local governments making it near impossible for any new broadband providers to be introduced into the market as they are required to compete with already existing municipal monopolies. "Legislation in 2013, added new obstacles to municipal broadband by placing restrictions on the use of municipal bonds to fund broadband projects. Municipalities that are offering wholesale services for publicly-owned broadband infrastructure, however, are exempt from many of these requirements" (Cooper, 2021).

Approximately 9000 people in San Juan County do not have access to 25 Mbps wired internet.

Approximately 4000 people in San Juan County do not have any access to wired internet.

= 100

Broadband Access

According to Broad Band Now, the average download speed in Bluff, UT is 0.1 Mbps and costs on average $3.61 per megabit. The average download speed in Salt Lake City, UT is 138.2 Mbps and the average cost is less than $0.60.
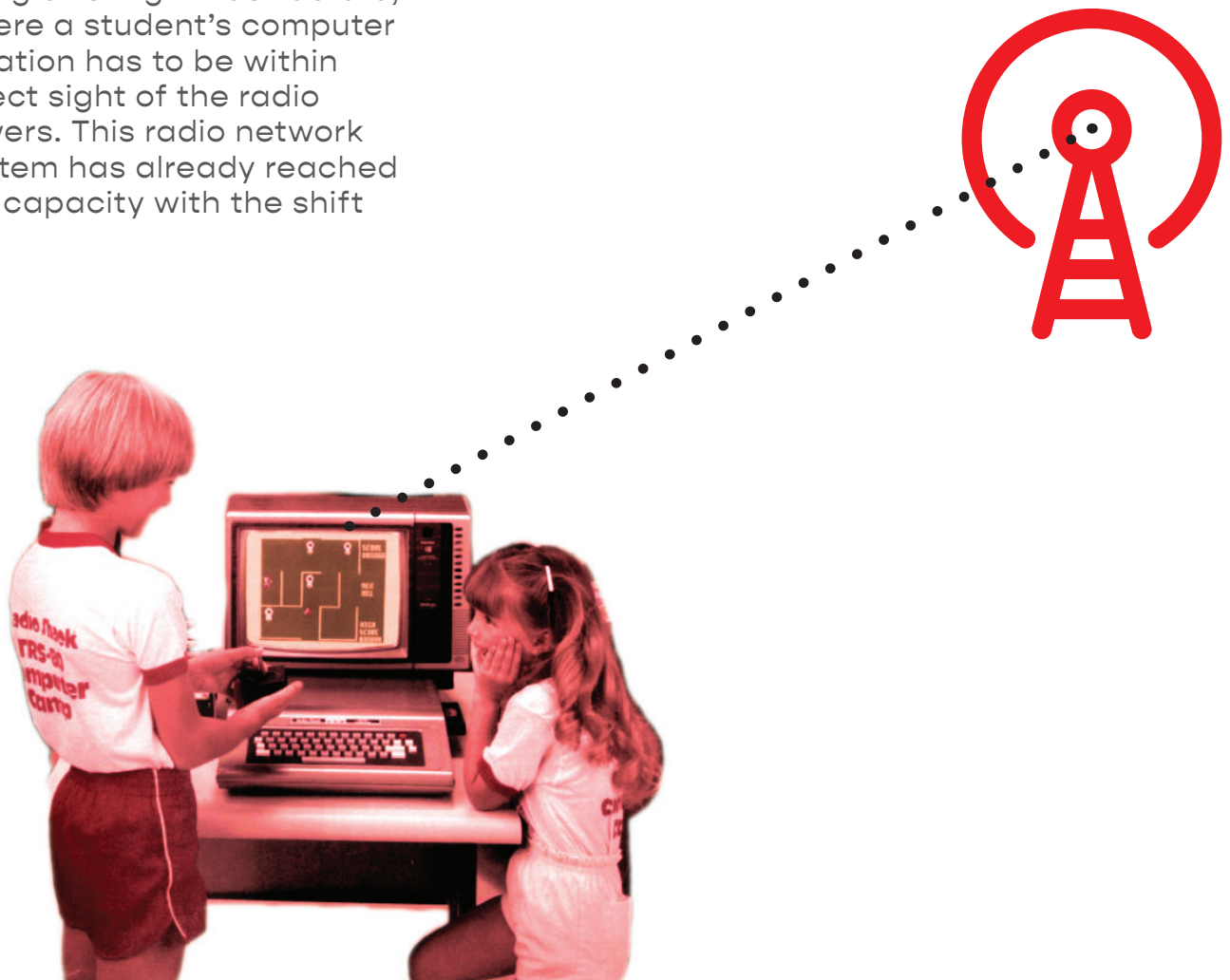
Broadband is about more than just being able to browse the internet and

scroll through social media and it's more than a utility. Broadband access is way of community communication and mutuality. We should be focusing on community service over customer service in rural areas like San Juan County especially.

Current Systems

According to journalist and reporter, Kate Groetzinger, The Utah Education and Telehealth Network initiated a plan to connect schools in San Juan County to ensure bandwidth for all students. The UETN currently provides bandwidth for students via a microwave radio system using existing infrastructure, where a student's computer location has to be within direct sight of the radio towers. This radio network system has already reached full capacity with the shift to online learning over the past few years – not to mention that if you were to microwave something in the same place as a student, it could effect their network connection.
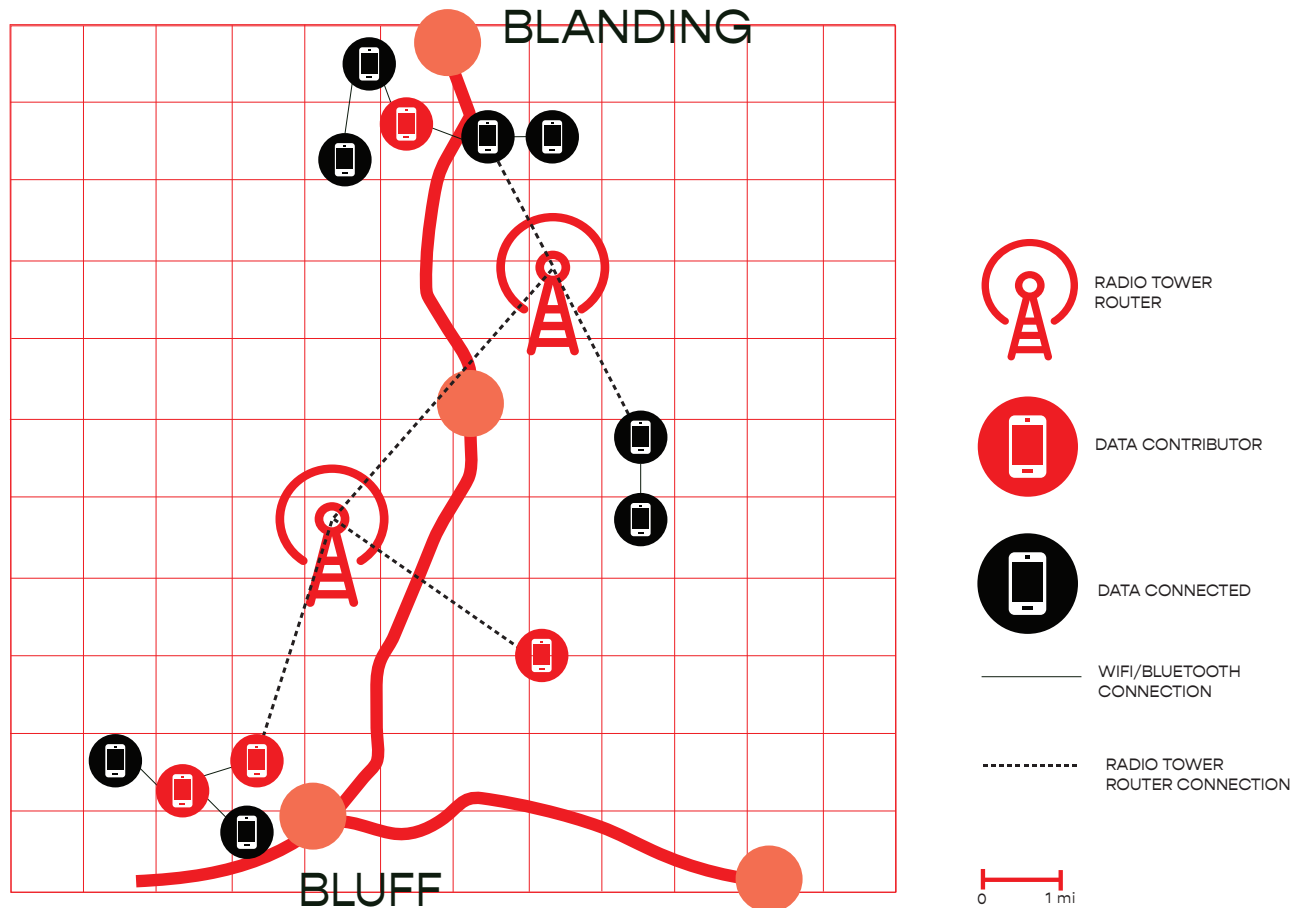
BLANDING

WHITE MESA

MONTEZUMA CREEK

BLUFF

HALCHITA

MEXICAN HAT

NAVAJO MOUNTAIN

OLJATO-MONUMENT VALLEY

KAYENTA

TSEGI

SHONTO

Fiber Installation

Emery Telecom began a fiber internet connectivity plan in October, 2020 and originally estimated it's completion for June, 2022. This fiber project was planned in two phases – phase 1 was to bring the fiber lines down from Blanding, UT to White Mesa, and Montezuma Creek. Phase 2 is to bring the lines down through Mexican Hat, Monument Valley, and Navajo Mt. This project has lost momentum as it reaches indigenous land. "The process was complicated by the fact that the tribal land in White Mesa is split into allotments, which are assigned to tribal members, and 50% of the allot tees had to sign off on the project in order for Emery Telecom to receive a right-of-way permit to lay fiber along the side of the highway in White Mesa" (Groetzinger, 2020).

BLANDING

BLUFF

RADIO TOWER
ROUTER

DATA CONTRIBUTOR

DATA CONNECTED

WIFI/BLUETOOTH
CONNECTION

RADIO TOWER
ROUTER CONNECTION

0   1 mi

Mesh Network

The Red Rock WIFI Project is a community focused mesh data network platform that works with both the local residents as well as visitors to the area. Through data collection and sharing among residents and visitors, the Red Rock WIFI Project acts as a platform for individuals to engage in node to node or peer to peer messaging, content sharing, and distribution. The platform also allows for data collection within the system. With the Bureau of Land Management's estimated 161,247 visitors to Bears Ears National Monument in 2020, there is no shortage of data to be collected and contributed within the Red Rock WIFI project. The platform creates a network for these visitors to share whatever portion of their cellular data to the mesh system as they like as an act of reciprocity.
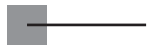
Mesh Mechanics

So what is a mesh network exactly?

Mesh wIFI is a system where individual devices, known as nodes, connect with each other directly and non-hierarchically to establish a virtual network. Mesh networks are extremely scalable as the nodes are able to communicate with each other and can extend

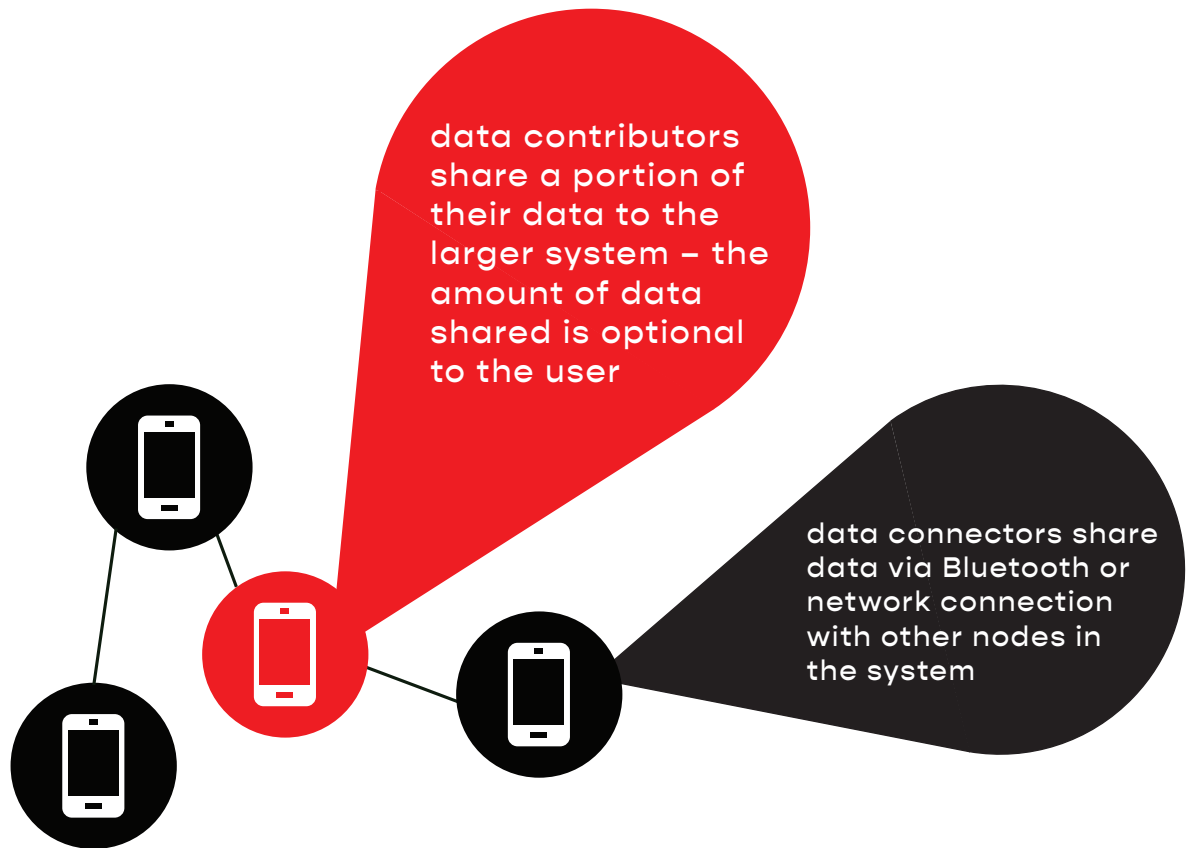their communication as new nodes enter the network (Net Motion Software, 2021).

By using the radio towers in San Juan County, the existing infrastructure can be utilized in the Red Rock WIFI Project mesh network as well as mobile devices, internet routers, and computers.
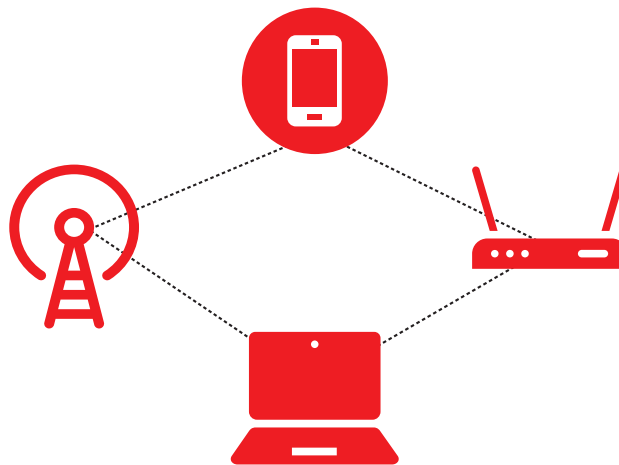
Because mesh networks are extremely scalable, on mesh network is also able to connect to another mesh network and the radio towers in San Juan County act as a prime component of longer range broadcasting than a mobile device is capable of on it's own.

A mesh network in Blanding, UT could connect to another mesh network in Bluff,

UT resulting in a singular, connecting network between the two cities.

data contributors share a portion of their data to the larger system – the amount of data shared is optional to the user

data connectors share data via Bluetooth or network connection with other nodes in the system

Red Rock WIFI Project Platform

The Red Rock wIFI project allows users to contribute a portion of their cellular data. The platform acts as a data farming resource to collect contributed data from visitors and locals of the area. Users in the system are able to connect to other nodes (other devices) via Bluetooth if they are in range or through network connection. The more data contributors there are sharing cellular data, the stronger the network becomes and the further the network's range becomes.

"Grand Gulch, Bears Ears National Monument, Utah" by Conspiracy.
of.Cartographers is licensed with CC BY-NC-SA 2.0.

Entering the Network

To enter the network as a mobile device user, an county-wide automatic alert would come up on the user's mobile device screen the moment they enter San Juan County through the Exposure Notification system already available on IOS and Android systems. This notification would inform visitors of the data contribution as an act of reciprocity and allow users to enter a digital platform component of the Red Rock WIFI Project.

This platform acts as a highly beneficial tool for local activists and community members, such as Rural Utah Project, to communicate "off the grid" and without the reliance of being in the municipal broadband monopoly of the area.

Community Impact

Users of the Red Rock WIFI Project are able to use the platform for peer to peer messaging, distributing content, and sharing data with each other.

The Red Rock WIFI Project acts as a way to create a community led and run network and resist autocratic control of community systems.

This platform creates a community led effort to close the digital divide by bringing data connection to community members and visitors through an infinitely scalable mesh network.

"Bears Ears National Monument, Utah" by Conspiracy.of.Cartographers is licensed with CC BY-NC-SA 2.0.

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ACKNOWLEDGMENTS + CREDITS

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RED ROCK WIFI PROJECT

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