



Exploiting Mesh Networks to Bridge The Digital Divide

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Wireless Mesh Networking

Mesh networks create a resilient infrastructure using a combination of wireless networking technology and ad-hoc routing protocols which together provide the ability to establish networks in places without any existing infrastructure.

Wireless Mesh Networks are seen to be:

- Self-maintaining, self-repairing in nature
- Provide routing, gateway and client management functionality
- Distributed, requiring no formal central control
- Easy to establish, with little or no formal planning

The robust nature of Mesh networking makes it an ideal technology to use in rural villages where the cost of establishing a wired network would ordinarily be high.



Internet access at the local Café and craft shop

Social and Economic Benefits

The village of Wray is mainly a farming community and the introduction of Broadband connectivity has enabled the local farmers to remain competitive within a highly aggressive market. The use of IT and communications means they are able register new born calves on-line, saving paperwork, postage and most crucially time. Other small businesses, such as jewelers and stonemasons have transformed themselves from local to international businesses through their e-commerce web sites.

- The network has over 150 active users, daily
- Utilising various applications and traffic types, e.g. Video conferencing, surfing the web, email and online gaming
- Sparked local initiative to setup other community mesh networks

Wray Mesh Network

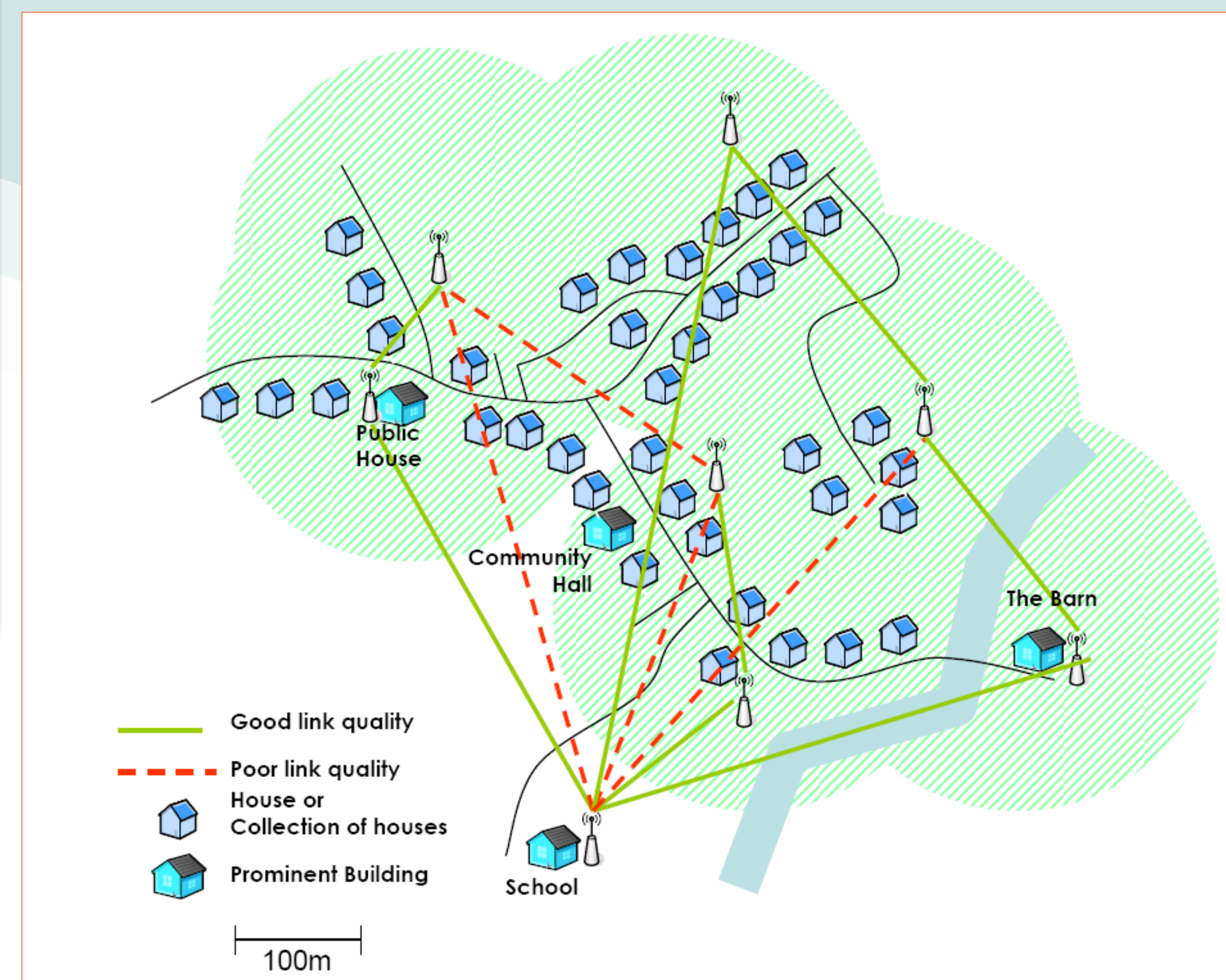


An aerial photo of Wray Village

The village of Wray is situated approximately ten miles from the city of Lancaster in the North West of England, and has a population of approximately 500.

In early 2004, Lancaster University's Network Research and Special Projects Unit (NRSP), in collaboration with the Wray village community, created a project to deploy Mesh networking technology into the village.

The purpose of the project was twofold, firstly to build a live network testbed within a deeply rural community for the purpose of research. Secondly, it gave the community access to broadband for the first time.



A Schematic of the Wray Wireless Mesh Network

Abstract

Despite the escalating nature of urban network infrastructures, the lack of adequate Internet provision in rural areas is potentially widening the “digital divide” between town and country in a way which affects social communication, education and rural businesses. In rural areas that are fortunate enough to have a broadband internet service, it typically does not match the high bandwidth and low latency standards experienced by their urban counterparts.

Recent advances in wireless network communications has seen the development of Wireless Mesh networks, a technology providing a complete wireless infrastructure solution allowing the provision of network services into locations where there is currently little or no infrastructure.

Even though Wireless Mesh networks are in their infancy, they are being used successfully for a wide range of application scenarios including network deployment for emergency environments, permanent network structures for rural and third-world locations as well as temporary networks for social events. Wireless Mesh networks are seen to be a complete package, providing all the necessary means to establish, manage and customise a network.

This poster details the technical and social experiences associated with the deployment of a Wireless Mesh Networking infrastructure within the village of Wray, located in the North West of England. The research is aimed at discovering the technical challenges associated with mesh networking outside of a laboratory environment, to provide a basis for further research. It has produced both European and International published articles and attracted case studies from bodies such as the BBC. In addition the research network has provided an Internet connection to over one hundred homes, promoting local business and education.



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