iNethi Community Network: A first look at local and Internet traffic usage

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ABSTRACT

This poster presents *iNethi*, a community wireless network deployed in a peri-urban township of Cape Town, South Africa. Initial usage clearly indicates a demand for Internet-based external services and, to a lesser extent, local services. We focus on the initial months of our deployment, and interaction with locally installed INethi services, as well as the impact of access to the Internet. We present data from our traffic logs, captured during a period of six months. We observed that a large proportion of data is being consumed by software or antivirus updates. The data collected and trends observed will allow iNethi operators to make necessary adjustment to the networks.

CCS CONCEPTS

• **Networks → Network measurement**; **Network performance analysis**.

KEYWORDS

Community network, Internet usage, local content

1 INTRODUCTION

The rationale behind setting up a wireless community network (WCN) are multiple. Firstly, thanks to locality of interest, it helps to strengthen and increase connections among people in the immediate vicinity [1]. Secondly, in developing regions, users pay a premium by having to send messages around the world just to arrive on the phone of a friend across the street [2, 3]. The challenge is to find the right mechanisms to cache traffic at the edge of the Internet [4, 5]. We present *iNethi*, a WCN that provides both access to local services and Internet access.
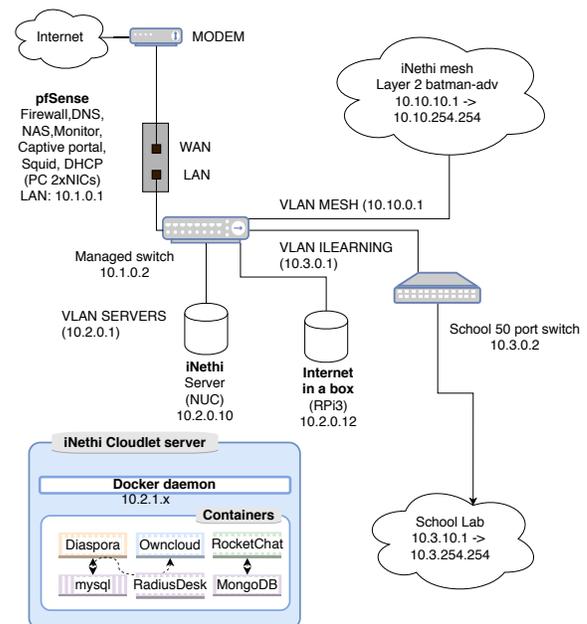
Figure 1: The network is designed around two needs: (a) Access to local content and services and (b) Access to the Internet through a radius authentication and accounting system. WiFi access is provided through 9 WiFi mesh node spread across the community. The current Internet link has been sponsored by Sonic Wireless (10 Mbps downlink and 5 Mbps uplink). Sonic Wireless provide access through a series of 5 GHz wireless backhaul radios that connect to fibre approximately 10km away.

2 NETWORK USAGE ANALYSIS

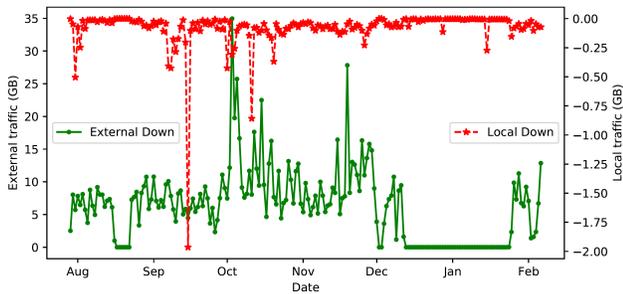**Local and external download traffic overview**

Figure 2: Time series of Down-link daily throughput for both local (red: -ve scale) and external services (green: +ve scale). First we observe that download from external services is almost 50x more than local services, as users are generally more interested in "popular" service than in local educational material, even though they are zero-rated. Over the 6-month period, we do however see download activities on the local services, which tends to show that local services are used.

(a) Local Services
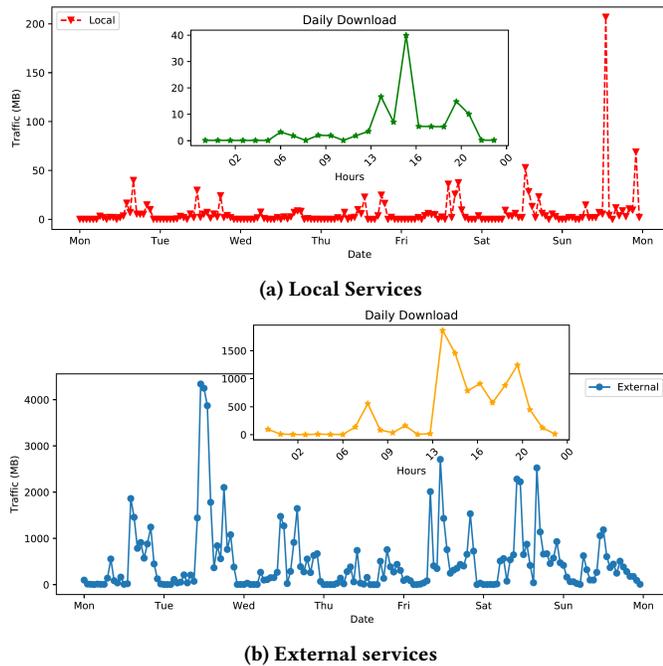

(b) External services

Figure 3: The local download traffic is negligible as compared to Internet traffic. The network traffic shows a strong diurnal pattern, with peaks at around 8am, 2pm and 8pm. the local services download traffic also follows a diurnal pattern with a peak at 2pm. This peak corresponds to heightened usage during school hours.

Web traffic analysis

We did a first-hand analysis of the HTTP user-agents and found out that a majority of users (66%) are using Android devices, out of which 23% are using Android 7.0 (release in 2016). The most used browser is by far Chrome Mobile at 74%, followed by Opera, Internet Explorer, etc making up the remaining 26%.
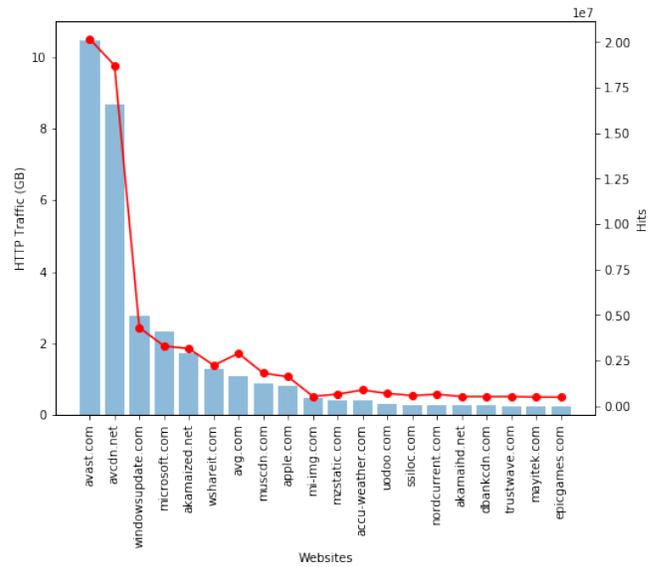
(a) Websites accessed from the "School" site
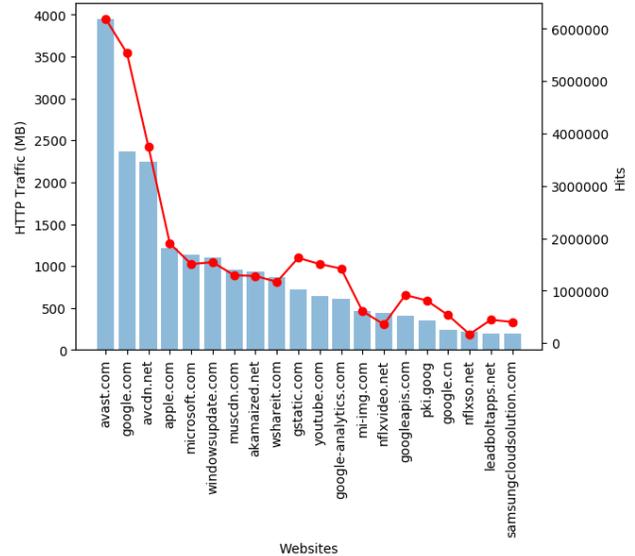
(b) Websites accessed from the "Mesh" site

Figure 4: Most visited websites from school and mesh. We observed that Avast, which is an anti-virus software, is consuming lot of Internet traffic (up to 10 GB for the school) and (4GB for the mesh). We also observed updates namely from Microsoft or Apple.

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