

One Laptop Per Child Program: Field Visit to Dadeldhura

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Location: Dadeldhura (DDL)
OLE Staffs: Mahabir Pun, Network Director
Sunil Shrestha, Senior Network Engineer
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Volunteers: Bhim Dhimi, Ram Shah, Ganga Bhatta, Bipin Bhatta
WFP Staffs: Rabindra Chand, Sudeep Thapa

Objective:

To connect school servers located in 3 different places of DDL through WFP office. The idea is to update school servers remotely from WFP office and ultimately from OLE Nepal office, kathmandu once the whole network is setup.

In this visit, the team only aimed at connecting two sites out of three -Janajyoti Pra Vi., Hamtad and Samaiji Pra. Vi. School, Haat, as there was no electricity at the relay point that would connect WFP to the 3rd school Janata Pra. Vi. Koral. A teacher at Janata Pra. Vi. informed that the talk for pulling electricity cable was in process but he didn't know when exactly would the actual work start.

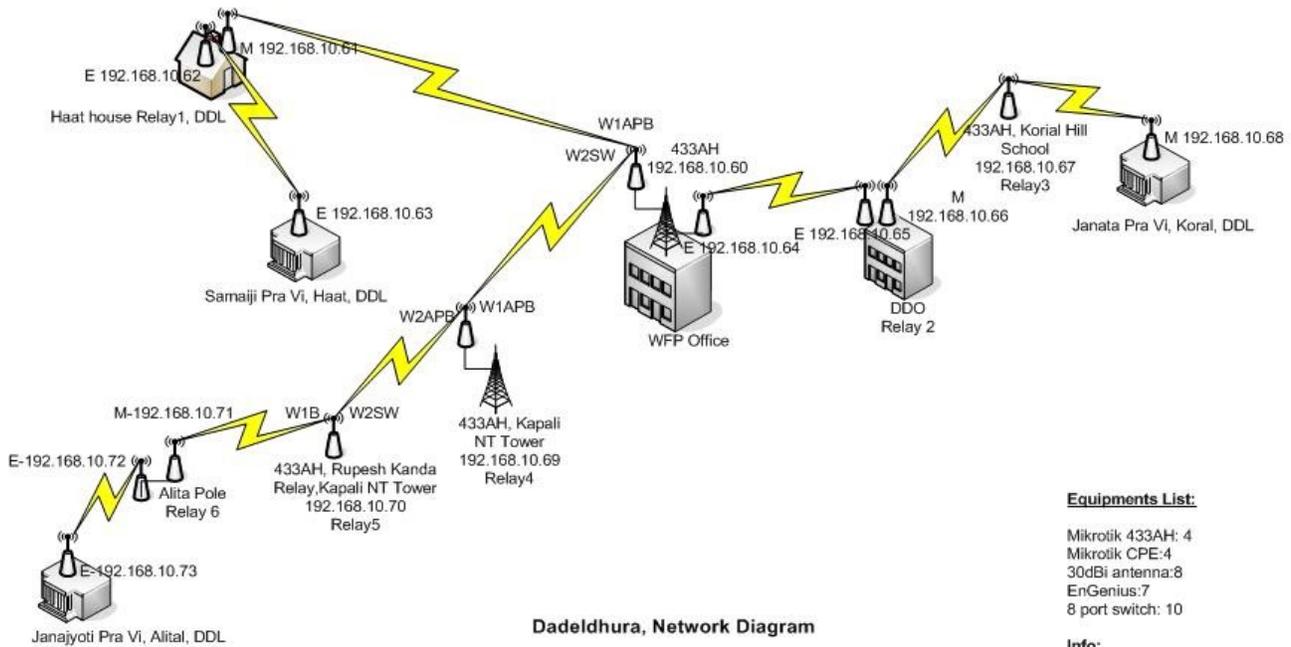


Two 30 dBi grid antennas installed by the Team

Accomplishments:

The network team was able to accomplish somewhat 80 % of the total work assigned. Please refer to the network diagram below:

1. Connected Samaiji Pra. Vi. Haat to Haat House Relay1
2. Connected Haat House Relay1 to WFP Office
3. Connected WFP Office to Kafaledanda NT Tower
4. Connected Kafaledanda NT Tower to Rupaskanda Relay5
5. Connected Hamtad, Relay 6 to Janajyoti Pra. Vi. School.



Equipments List:

Mikrotik 433AH: 4
Mikrotik CPE:4
30dBi antenna:8
EnGenius:7
8 port switch: 10

Info:

W#APB: wlan # ap bridge mode
W#B: wlan # bridge mode
W#SW: wlan # station wds
M: Mikrotik CPE
433AH: Mikrotik 433AH
E: EnGenius

Although the previous network team had already installed the radios that would connect WFP office – Haat House – Samaiji Pra Vi. , we observed that none of the links were working.

We replaced the existing Engenius Radio with a Mikrotik Router Board 433 AH with 3 wireless cards in it. And to go with it, placed two 30 dBi grid antenna -one linking Kafaledanda NT Tower and other linking Haat House Relay1. One other reason for using this Router board here is that it would act as a 3 way relay point in future when we would link Koral School from here.

One faulty Engenius radio at Haat Relay was replaced with a new one. School Server at WFP is now connected all the way to Haat School.



Antennas tied to a tree at Rupaskanda.



Radios at Haat House



Network Team working at WFP tower

At Rupaskanda, approx. 300 meter long power cable was drawn from nearby Janasewa Primary school up to Rupaskanda hill. A Mikrotik Router Board 433 AH has been installed. To go with it, two 30 dBi external antennas, one pointing to relay at Hamtad and other pointing to Kafaledanda were installed.

At Kafaledanda NT Tower, we installed a MikroTik 433 AH Router board. And to go with it, put two 30 dBi external antennas -one pointing to Rupaskanda and the other one pointing to WFP office. Tested the link from the top of the 40 meter high NT tower. It connected. But we were to fix our antenna down below at 15 meters' height. We really had to work hard to get Line of sight from below there. We were trying to do this link even on the day before we came back. Fortunately, it worked the last day.

Linking Kafaledanda took most of the teams' time and effort. We had to do more than 10 trips to Kafaledanda in order to accomplish this. One thing I don't want to miss mentioning here is that we only got 2-3 hours a day to work in the tower -mainly because of 2 reasons - very very unpredictable weather over the hill and we had to set aside almost 7 hours to come to and go back from the tower. You are not allowed to enter the area until 10 am and if you don't return by 4 pm you would not be able to make it to the WFP vehicle waiting down the hill for you. WFP have this regulation of having to return the vehicle at office by 6 pm.

Number of Radio Equipments Used so far:

MikroTik Router Board 433 AH – 4

MikroTik CPE - 2

Engenius Radio - 4

External Antenna – 4 sets.



A teacher from Janajyoti School climbs the tree to install wireless radio



Network Engineer, Sunil Shrestha working in the NT tower.

Works Remaining:

1. Connection from Rupaskanda to Hamtad relay 5.
2. Hamtad Relay point to Janajyoti School. (*This connection actually has already been made but will have to redo the positioning of radios if we have to change the position of Hamtad Relay point.*)
3. Install a Relay at DDO office DDL.
4. Install a relay point at Koral Hill.

Works 3 and 4 was possible to do in this visit but it was useless cause you would not be able to connect to Koral School anyway because there is no power at Koral Relay.

Note: All the required equipments for connecting Koral School have been left at WFP, Office so that it would be easier for next visit.

Geography of sites:

Hamtad, Alital: About 1.15 hours drive from Budar, Doti. Rough Road, with 3 – 4 river crossing in between. Very vulnerable to land slide and takes 4 – 5 hours if you have to walk. Janajyoti School is 10 minutes climb up a small hill from road. CDMA or NT mobile network are not available. Only means of link is the fixed line CDMA phone at a shop down the hill.

Rupaskanda: 10 minutes walk/climb from the motor road. The hill is full of leeches in rainy season. It is recommended you climb on slippers cause there is no escape from those leeches -one of them is surely gonna get you anyway and it is easy to remove them if you have slippers on .

Kafaledanda: An army squad of 40 has been designated permanently for the purpose of protecting the Nepal Telecom mobile tower at Kafaledanda hill. OLE Nepal was given special permission to put wireless antennas. The place is about 2 hours walk/climb from Saukharka, DDL. On the way, the jungle gets dense at times. It is recommended that someone who is been there before lead the way cause it is very easy to get lost at few places. It is always cold and windy at Kafaledanda. Weather is totally unpredictable. It rains almost every day.

You need to inform the army captain in charge and get permission to enter the tower premises. He has to be informed one day in advance. And of course you need to get permission from Officer incharge of the tower from Nepal Telecom.

Challenges/Suggestions:

The rainy season is undoubtedly the worst possible season for network team to work in. Very uncomfortable walk, landslides at places, increased interference for radio line of sight, inability to efficiently tune antennas due to poor visibility to human eyes all contributed in making the work difficult and time consuming for the network team. I suggest network team to avoid working in raining season when possible. It turns out to be both unproductive and expensive.

The team had difficult time getting appointment with the Nepal Telecom Personnel who was in charge of the tower there. We had to wait almost 3 – 4 days waiting for him to call us and give us time. Finally we got hold of him at his office and he agreed to come with us to the Kafaledanda the following day. It turned out he was a nice and helpful man and gave us permission to go above 15 meters limit on the tower to test the link. But we would only be permitted to permanently fix the antenna at 15 meters' height. Fortunately, we got Line of Sight at this height also.

Things we wished we had taken along:

A pair of binoculars

A pair of walkie-talkie

An umbrella

An insect spray

a voltage stabilizer and a multimeter

A support belt (It is really risky to work in high towers without some kind of support)

During the visit, we had times when we had made the wireless link the previous day and it would not work the other day. At one point we had to climb all the way to the top of the Kafaledanda just to find that our PoE adapter had been switched off because some NT officer apparently had ordered to do so. One other day, we reached Rupaskanda, and found that there had been power cut the whole day due to some problem in some transformers.

Conclusion:

This visit gave some mixed results -some success, some lessons to learn, some experience. Despite unfavorable climate and circumstances, the result the team had achieved is remarkable. And I suggest the next visiting team to make a through plan before going on such field work.