



Changing Young Lives in Nepal – Mikrotik MUM, Kathmandu 2nd June 2017



- Introduction
- Our Project
- Challenges
- Solutions
- Our successes
- What next

ANDY MORRISON

- Managing Director of Andisa IT Consultants Ltd – UK – 15 years
- Never been separated from a PC since 1983!
- MTCNA, MTCWE, MTCRE, Prince II project management, 3CX Phone Engineer, Degree in Electronics and Comms.
- President of Rotary Club in Harrogate





- Break Fix
- IT Support
- Cloud Server Hosting & Backups
- Hosted Exchange email / Office 365
- VoIP Telephone Solutions
- Full network Management
- Specialised Mikrotik networking practise including long range wireless, VLAN and routing



OUR PROJECT

- Rotary project Based in Panchamol Valley, Syangia. Funded partly through business partnership.
- 7 schools, soon to be 20
- Community Internet
- 200sqkm Wifi Network based on 30 Tiks
- Expanding by a further 45 Tiks
- We provide IT and internet access to high schools and then work to improve literacy teaching



Changing Children's Lives

NEPAL

Dhaulagiri ▲

CHINA

INDIA

- Around 4 hours drive from Pokhara
- Estimated population 25,000
- > 30% population below WHO defined poverty line
- Most are subsistence farmers

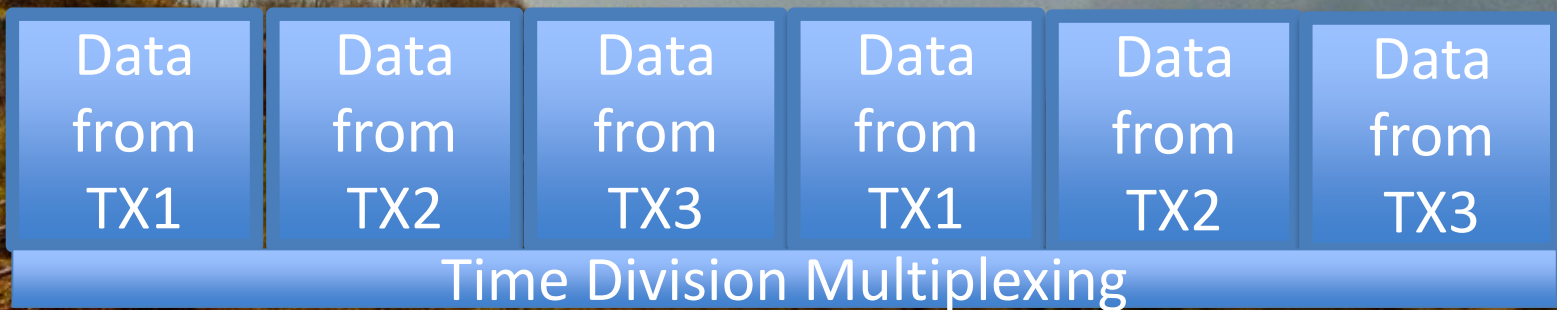
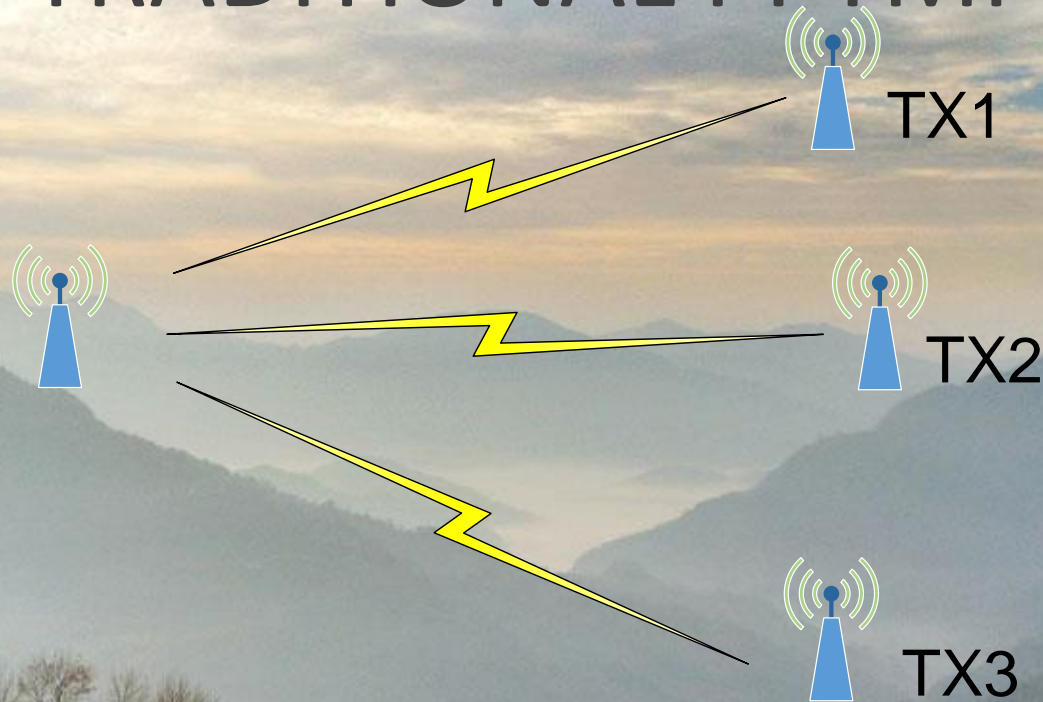
CHALLENGES OF A NETWORK



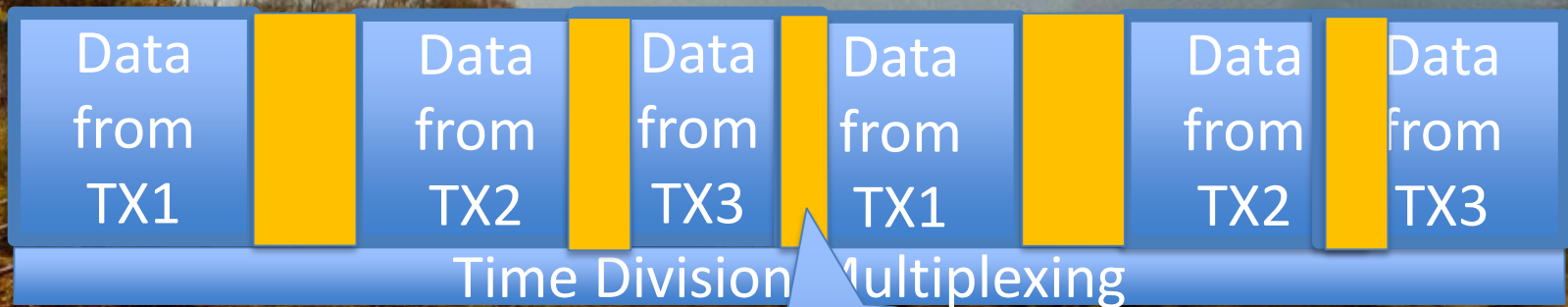
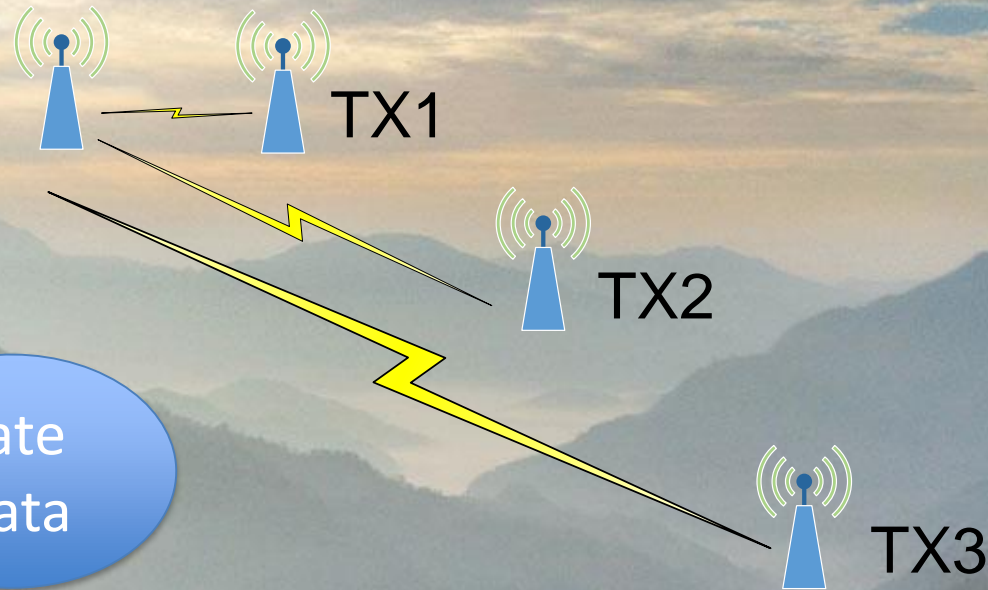
CONNECTIVITY

- Point to point links to deliver internet

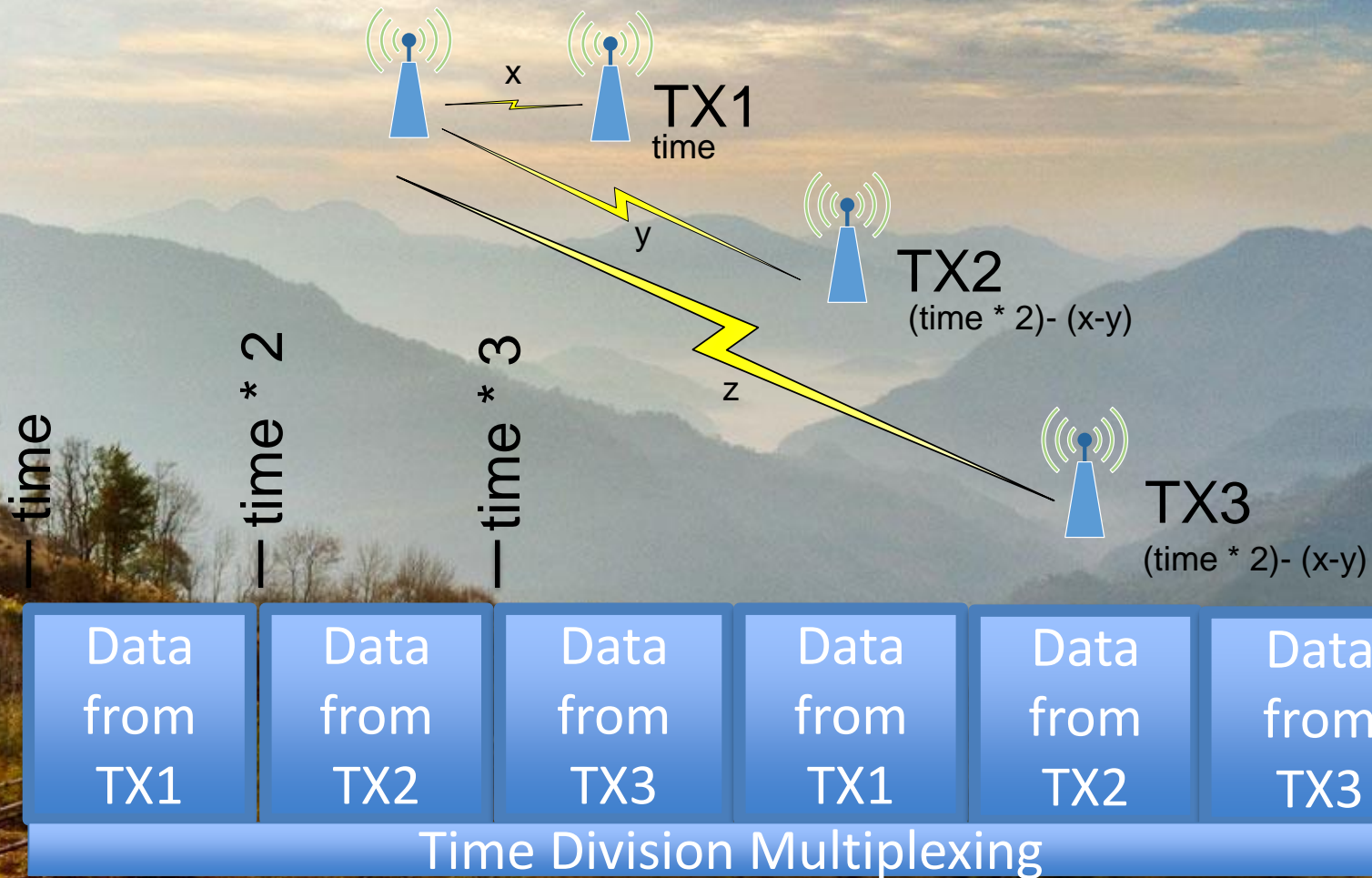
TRADITIONAL PPTMP



THE PROBLEM - DISTANCES



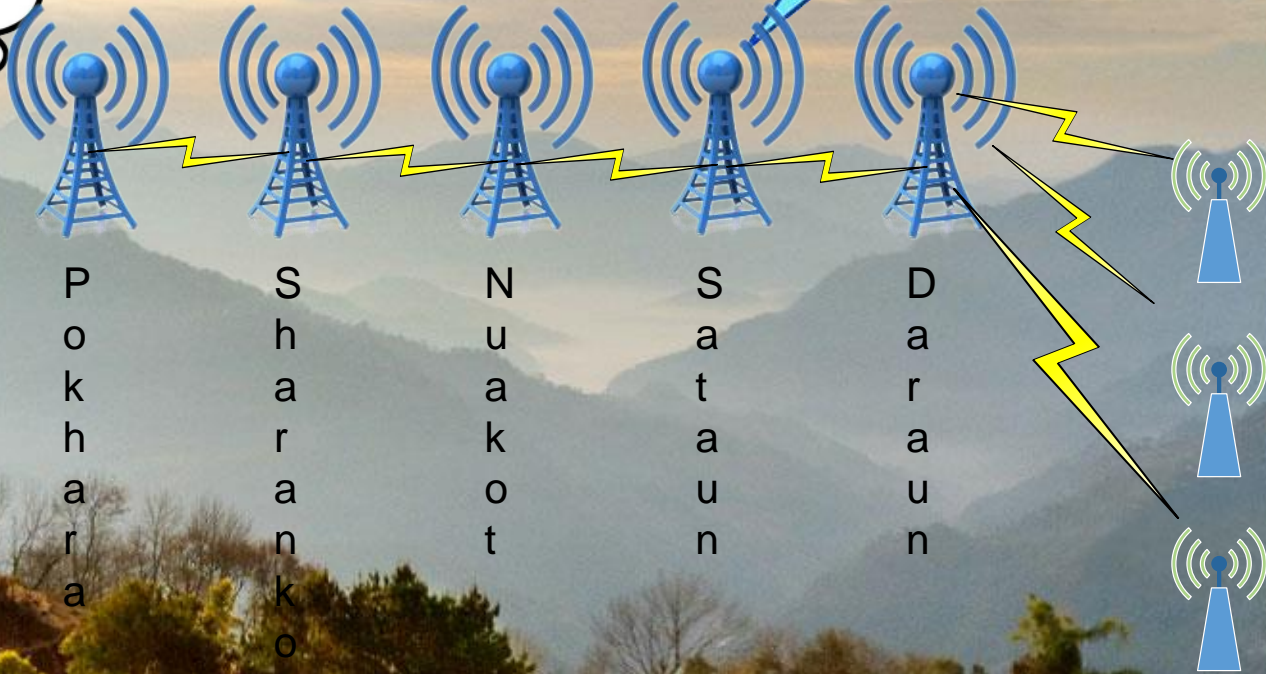
NV2 - THE SOLUTION



CONNECTIVITY FIXED

- Reliable speed even with differing distances
- Reduced cost
- Happy Customers

GEOGRAPHY & WEATHER

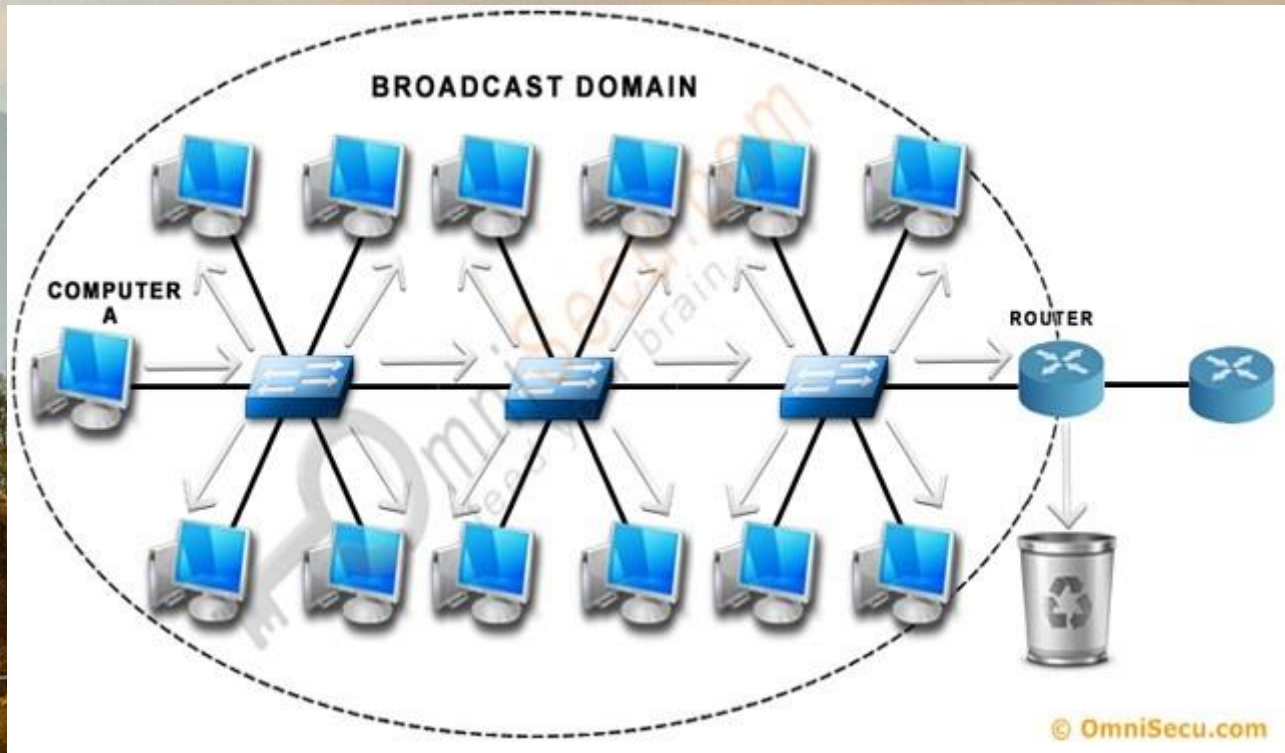


TRIANGULATION – THE SOLUTION

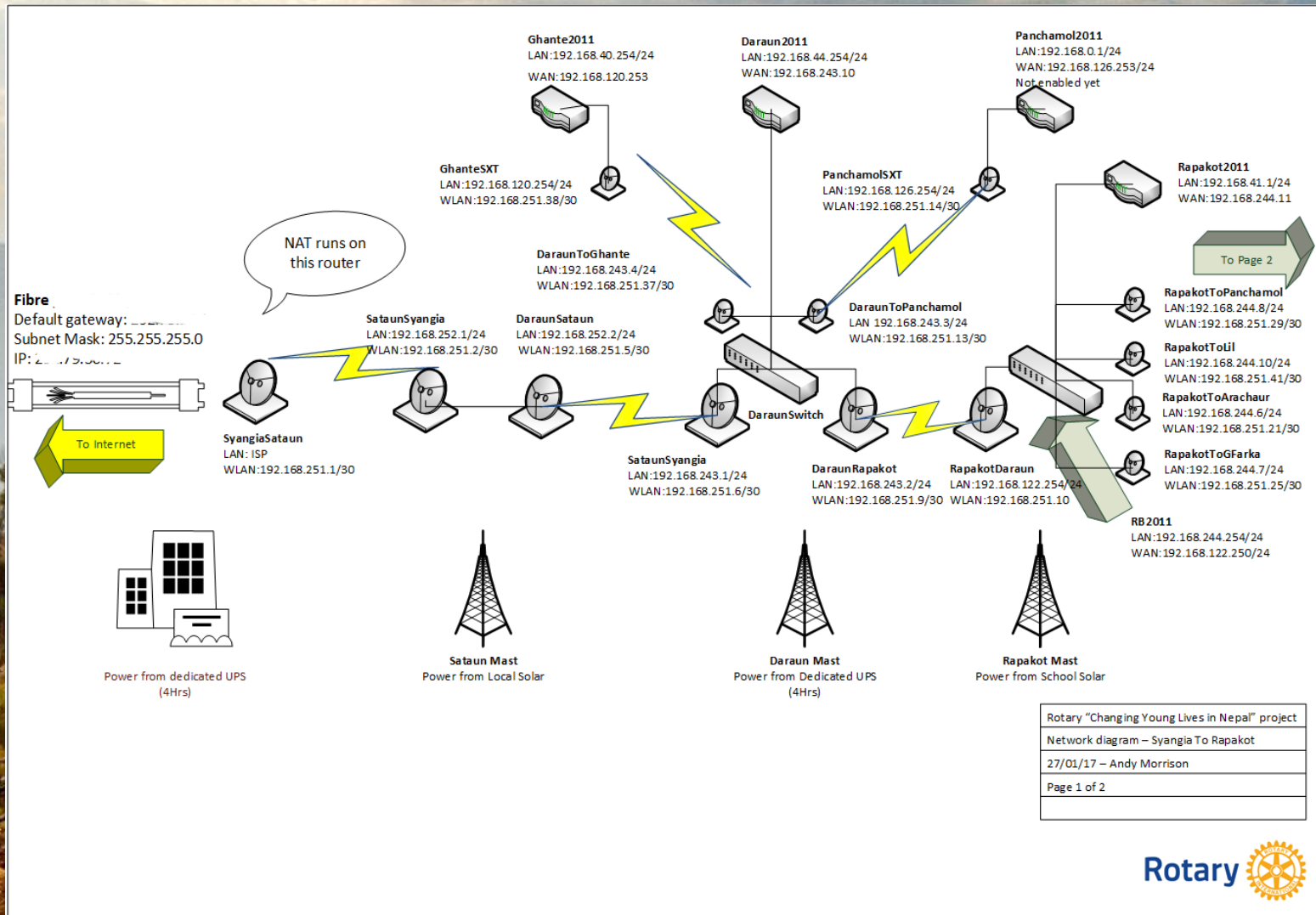


BRIDGES ARE BAD!

- Don't use one big class C network



/30 NETWORKS OR EVEN /32!



RESILIENCE WITH OSPF

The screenshot displays the Mikrotik WinBox OSPF configuration interface. The main window is titled "OSPF" and contains several tabs: Interfaces, Instances, Networks, Areas, Area Ranges, Virtual Links, Neighbors, NBMA Neighbors, Sham Links, LSA, and Routes. A table in the background shows the OSPF Instance configuration:

Name	Router ID
default	0.0.0.0

The "OSPF Instance <default>" dialog box is open, showing the following configuration options:

- Name: default
- Router ID: 0.0.0.0
- Redistribute Default Route: never
- Redistribute Connected Routes: as type 1
- Redistribute Static Routes: as type 1
- Redistribute RIP Routes: no
- Redistribute BGP Routes: no
- Redistribute Other OSPF Routes: as type 1
- In Filter: ospf-in
- Out Filter: ospf-out

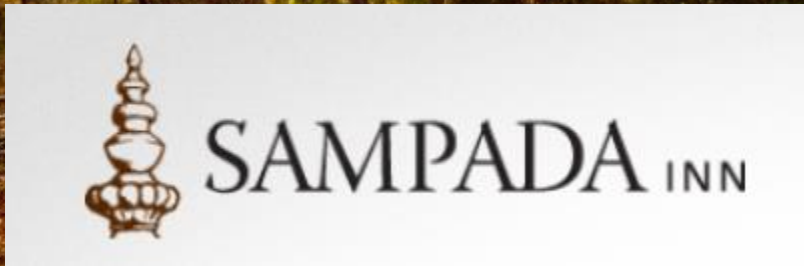
Buttons on the right side of the dialog include OK, Cancel, Apply, Disable, Comment, Copy, and Remove. The status bar at the bottom of the dialog shows "enabled" and "default".

es

RELIABILITY FIXED

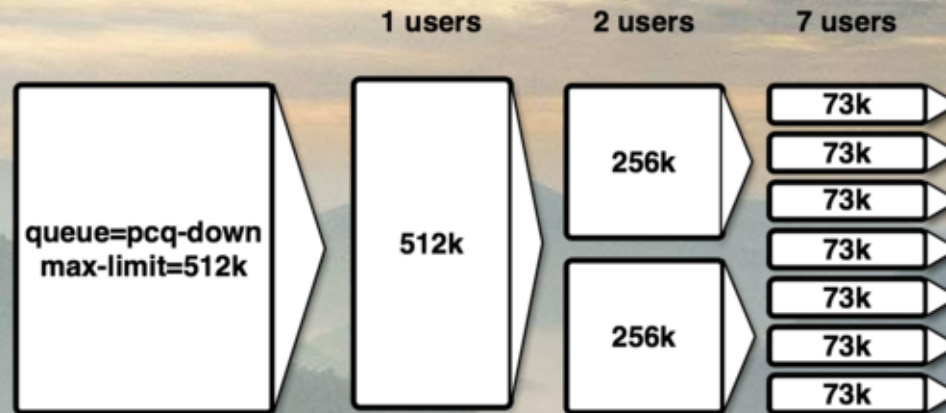
- Always on network
- Time to go fix
- Happy Customers

PERFORMANCE



PCQ

pcq-rate=0



PCQ SETUP – THE QUEUE

The screenshot displays the Mikrotik WinBox Queue List configuration interface. The main window is titled "Queue List" and shows a table of queues. A "New Simple Queue" dialog box is open, showing the configuration for a new queue. The dialog has tabs for "General", "Advanced", "Statistics", "Traffic", "Total", and "Total Statistics". The "General" tab is active, showing the following settings:

- Packet Marks: (empty)
- Target Upload: Limit At: unlimited, Priority: 8, Bucket Size: 0.100
- Target Download: Limit At: unlimited, Priority: 8, Bucket Size: 0.100
- Queue Type: Upload (highlighted in yellow)
- Parent: none

The "Queue List" table in the background shows the following columns: #, Name, Target, Upload Max Limit, Download Max Limit, Packet Marks, and Total Max Limit (bits/s). The "New Simple Queue" dialog is also highlighted in blue.

PERFORMANCE FIXED

- Equal sharing of bandwidth so everyone's happy
- Bursting so the first few files upload quickly
- Happy customers
- We use this to limit bandwidth per school (one simple queue per school), pay for differing bandwidth.

EASY MANAGEMENT

RoMON Settings

Enabled

ID: 00:00:00:00:00:10 ▲

Secrets: ***** ▼

Current ID: 00:00:00:00:00:10

OK

Cancel

Apply

Ports

Discovery

Ping

WinBox v3.0rc12 (Addresses)

File Tools

Connect To: 192.168.89.1 Keep Password

Login: admin Open In New Window

Password:

RoMON Agent: 192.168.89.1 ▼

Add/Set Disconnect From RoMON Connect

Managed RoMON Neighbors

Refresh Find

Address ▲	Cost	Hops	Path	L2MTU	Identity	▼
02:FB:47:C6:B7:49	200	1	02:FB:47:C6:B7:49	1500	ISP-Supplies-...	6..
4C:5E:0C:9D:E0:C4	400	2	02:FB:47:C6:B7:49, 4C:5E:0C:9D:E0:C4	1500	ISP-Supplies-...	6..
D4:CA:6D:B3:47:66	600	3	02:FB:47:C6:B7:49, D4:CA:6D:C7:9D...	1500	Cabin-DVR	6..
D4:CA:6D:C7:9D:98	400	2	02:FB:47:C6:B7:49, D4:CA:6D:C7:9D...	1500	DischerCabin	6..

4 items

WHY MIKROTIK

- They survive
- Nv2 – ptmp with varying distances
- Easy management
- PCQ – easy setup
- Certified training is available and important!

PROBLEMS ON OUR PROJECT

- Power
- Add UPS and surge filters
- Fit cables in tubes
- Remove legacy equipment
- Waterproofing of switches

SUCCESS

“Until this morning, I had little hope of competing against those students who had better access to modern education in Pokhara and in Kathmandu. Today is a historic day to all children of this remote Valley”

A pupil from a Panchamul Valley school

WHAT NEXT

- Community internet
- IME
- More schools in next valley
- School twinning exchanges with UK
- Musical concert using internet for rehearsals

QUESTIONS?



TO FIND OUT MORE ...

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