

Regional Development Forum 2008

**“Bridging the Standardization Gap in Developing Countries”
for the Asia-Pacific Region**

Hanoi, Vietnam, 15-17(am) September 2008

OLPC: One laptop Per Child

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Presented by John Visser, P.Eng.

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One Laptop Per Child

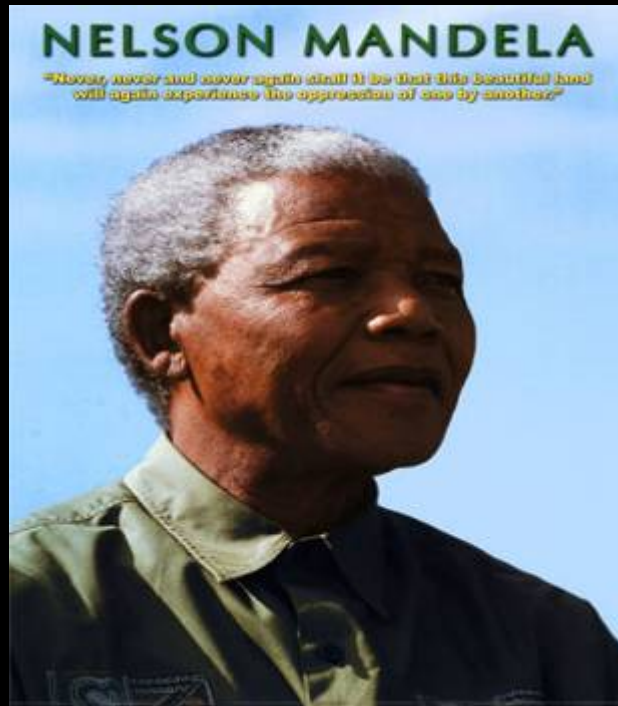
Dr. Bilel Jamoussi
CTO Office
Presented by
John Visser, P.Eng.
CTO Office - International Standards



NORTEL

ITU Regional Development Forum 2008:
“Bridging the ICT Standardization Gap in Developing Countries”
Vietnam, 15-17 September 2008

Education



**“Education is the single most powerful weapon you can use to change the world .”
Nelson Mandela**

- In sub-Saharan Africa, more than one-third of primary school-age children are not enrolled in school at all
- Those who do enter the first grade, fewer than half will complete primary school.
- Schools lack resources & qualified teachers
- Over 100 million children desperately want to go to school!

One Laptop per Child

A Nortel-Sponsored Project



Pain Point

- Availability and cost of devices



Background

- OLPC Foundation's mission is to stimulate local grassroots initiatives designed to enhance and sustain over time the effectiveness of XO laptops as learning tools for children living in lesser-developed countries

Solution

- Advanced Technology Collaboration on 802.11s Mesh Technology
- OLPC is a proof point of Hyperconnectivity
- Wi-Fi / WiMAX fundamental to educating the next generation



One Laptop Per Child

Five Principles:

- Child ownership
- Low ages
- Saturation
- Connection
- Free and open source





What is OLPC ?

- One Laptop Per Child (OLPC)
 - Vision of Nicholas Negroponte and members of the MIT Media Lab, a Non-profit organization
 - Education for all children
 - Opportunity for children of developing nations to:
 - Learn new technology
 - Develop new ideas
 - Collaborate with other children around the world
- OLPC has created the XO laptop

Principles

Child Ownership
Rugged exterior
Low power consumption
Connectivity & Apps
Free and open source





XO Fundamentals

Software

- Open Source
- Operating system is Fedora Core
- Special version of Firefox as web browser
- Word processor application
- E-Mail application
- Games
- Instant Messaging

Hardware

- AMD LX-Geode CPU at 700 MHz and 256 MB of RAM
- No hard disk. 1 GB flash memory
- Specialized LCD screen (Monochrome and Color mode) for saving power
- Built-in wireless network interface
- Color camera





XO – More Details

- High-resolution screen that can be read in direct sunlight
- Connectivity via WiFi or mesh network
 - Mesh turns each laptop into a full-time router
 - Router connects each laptop to allow for easy Internet access
- Low power consumption (10-20% of typical laptop; <1 watt as e-book)
- Can be powered without electricity, by using pull chords, solar panels, and hand cranks
- Contains no hazardous materials
- No moving parts, except for the rabbit ears and the hinge
- Rugged durability to withstand severe weather and environmental conditions: can be used outdoors in the rain, sitting in a puddle of water after a downpour, or in a cloud of dust. Fully water resistant, rubber sealed keyboard. Can withstand falls to 5 ft / 1.5 meters





XOs Interconnected

- Mesh network provides free, robust wireless connectivity between laptops within the community around each school
 - Typical connection between 200 and 1000+ children
- “School Server” - provides a gateway for the school's Internet connection and manages the IP address space within the schools
 - Point-to-multi-point, WAN links between schools .
 - Low-cost, point-to-point and done through terrestrial wireless links, such as Wi-Fi, or WiMAX.
 - The school servers themselves also form a mesh network that enables groups of schools to share the cost of Internet connectivity.
 - Designed for flexible interconnect: to an optional satellite up-link, fiber, DSL, cellular packet, etc. The specific choice is a local or regional one.



How do we participate?

Partner Ecosystem



Computing



Digital Content & Teacher Support



Education Solutions

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Applications
e.g., Multimedia
Communications

**Open Source
& Standards**
e.g., 802.11s

Networks

e.g., Broadband
Wireless

Funding & Guidance

Applications:

“Learning without Borders” enables...



The Potential

Global Classroom
(Students can interact with students anywhere in world)

**Tutors-on-Call/
Content-on-Demand**
(Volunteers can support students; online content promotes learning on demand)

Teacher Mentors-on-Call
(Volunteers can provide support to teachers)



Multi-Media Communications Enrich the Online Collaboration

Hyperconnectivity



Anything that *can* be connected and would benefit from being connected *will* be connected

Hyperconnectivity is Real and Happening Now



Person to Person



- Europe – mobile phones now outnumber people (>100% penetration)
- Global mobile IM continues to grow at double digit rates

- One Laptop Per Child



Person to Machine

- By 2010, worldwide:
 - 4-fold growth in Internet Commerce to 100B transactions
 - 1-2 billion A-GPS-enabled handsets
- 150 million iPods sold (March 2008)
- iPhone sales to hit 10M in 2008; hyper-connectivity at applications level

Machine to Machine



- 98% of all CPUs today are embedded (by 2010 – 14 billion connected, embedded devices)
- 70%+ of all 2007 cars in U.S. had iPod connectivity
- Sensor pocket in Nike shoes





Current Deployments

Africa



Rwanda
Nigeria

Asia



Thailand
Mongolia

Latin America



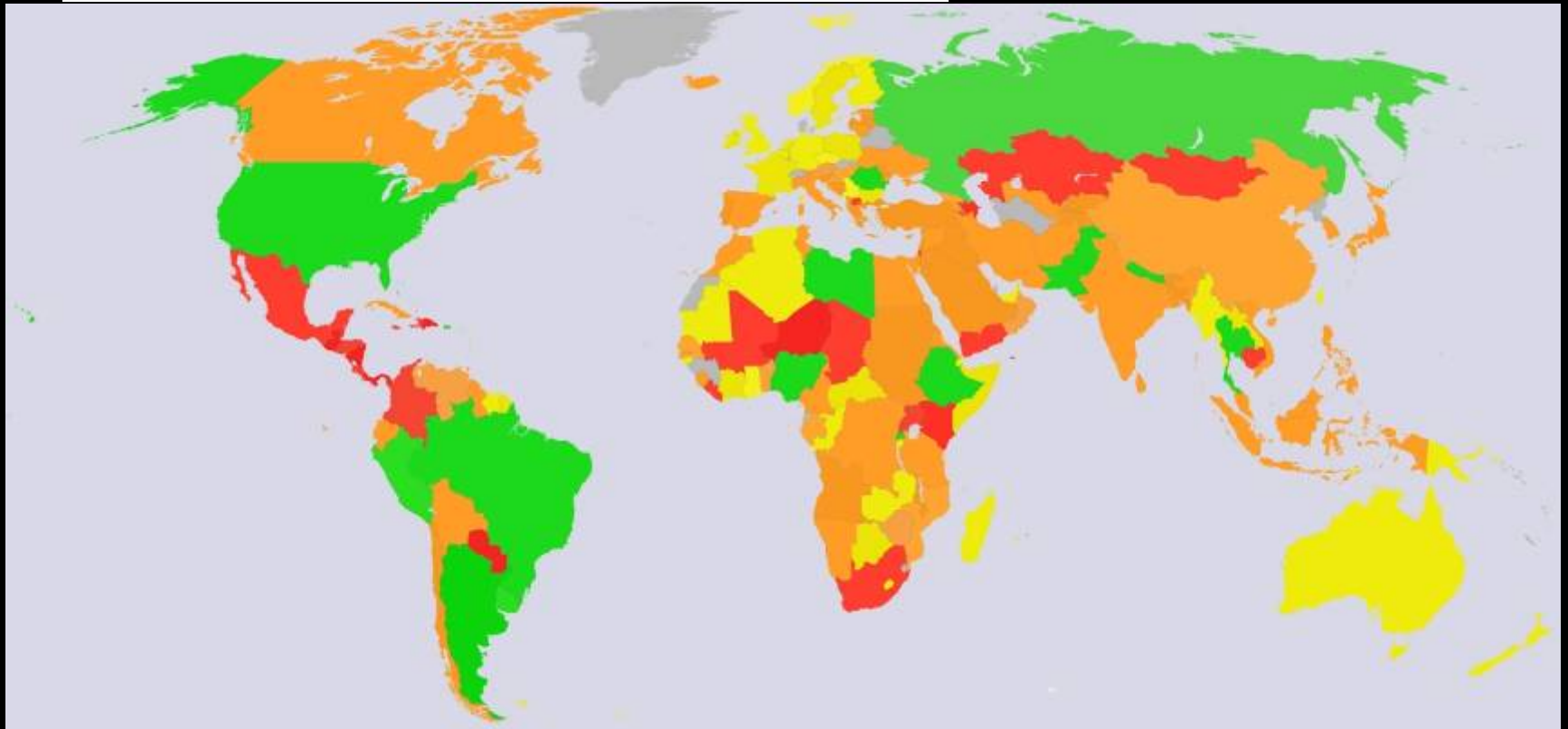
Uruguay
Brazil
Peru

Combination of Government Led and Corporate / Public Partnerships



OLPC countries

green	country planned to pilot
red	country planned to be included in the post-launch phase
orange	country has expressed interest at the Ministry-of-Education level or higher
yellow	country currently seeking government support
gray	no-information
white	could not determine status



Ref: <http://wiki.laptop.org/go/Image:Olpcmap.jpg>

OLPC Momentum

- Currently participating countries
 - Africa: Ethiopia, Rwanda
 - Americas: Colombia, Haiti, Mexico, Peru, USA
 - Asia: Afghanistan, Cambodia, Mongolia
 - Pacific: Papua New Guinea
- Small scale projects:
 - Africa - Middle-East: Iraq, Nigeria, Tanzania, Yemen
 - Americas: Brazil, Suriname
 - Asia: India, Nepal, Pakistan, Philippines, Thailand
- As of June 2008, trial deployments have started or are in preparation in at least 8 countries in Oceania
- OLPC TechFest - June 2008 - Australia

Visit http://en.wikipedia.org/wiki/One_Laptop_per_Child
for current information



Networks: Connecting Schools

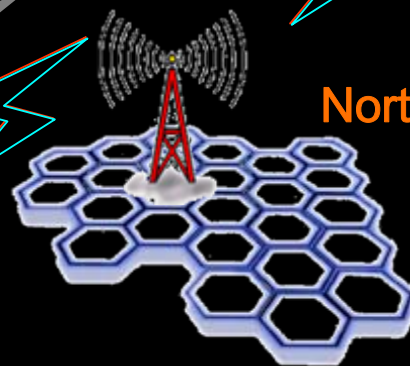


Nortel
WiMAX

School Gateway
To Wide Area



Nortel Wireless
Mesh



Nortel CDMA
EVDO



School WLAN Mesh

Connecting OLPC School to the Internet via Broadband Wireless



Networking Scenarios

Scenario #1

- XO's deployed in a school in an urban environment in a developing nation
 - Good cover from mobile 3G data networks
 - **Solution**
 - Wi-Fi access to the school and then connect the school to the mobile data network

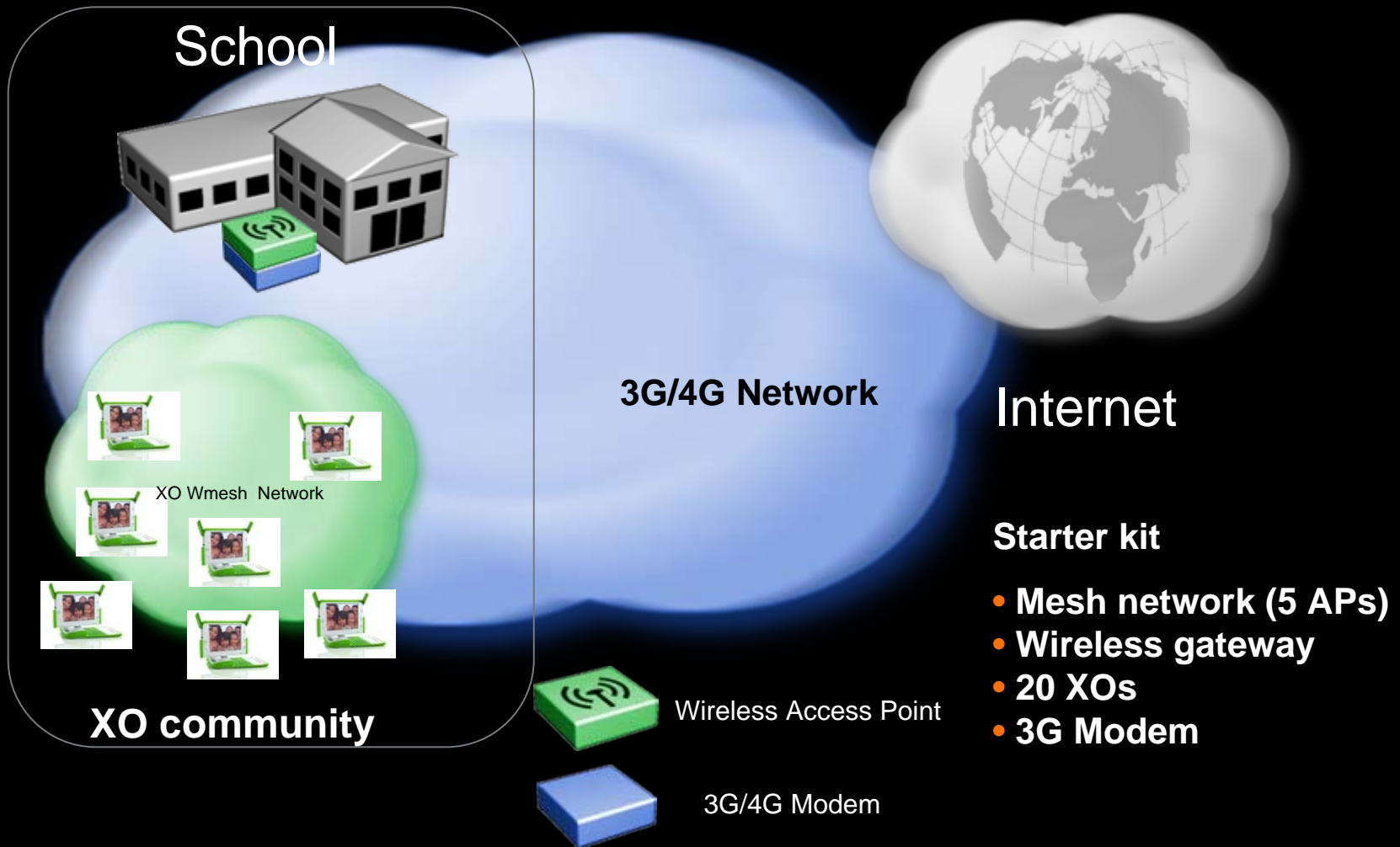
Scenario #2

- XO's deployed in rural area in a developing nation
 - No internet connectivity
 - **Solution**
 - Engage with the ministry of education of the country
 - Determine the closest tertiary educational facility
 - Deploy a server that acts as a top up and offload point for the XO's in the region
 - The solution would focus on the equipment required for the tertiary educational facility and to connect that facility to the internet



Scenario #1

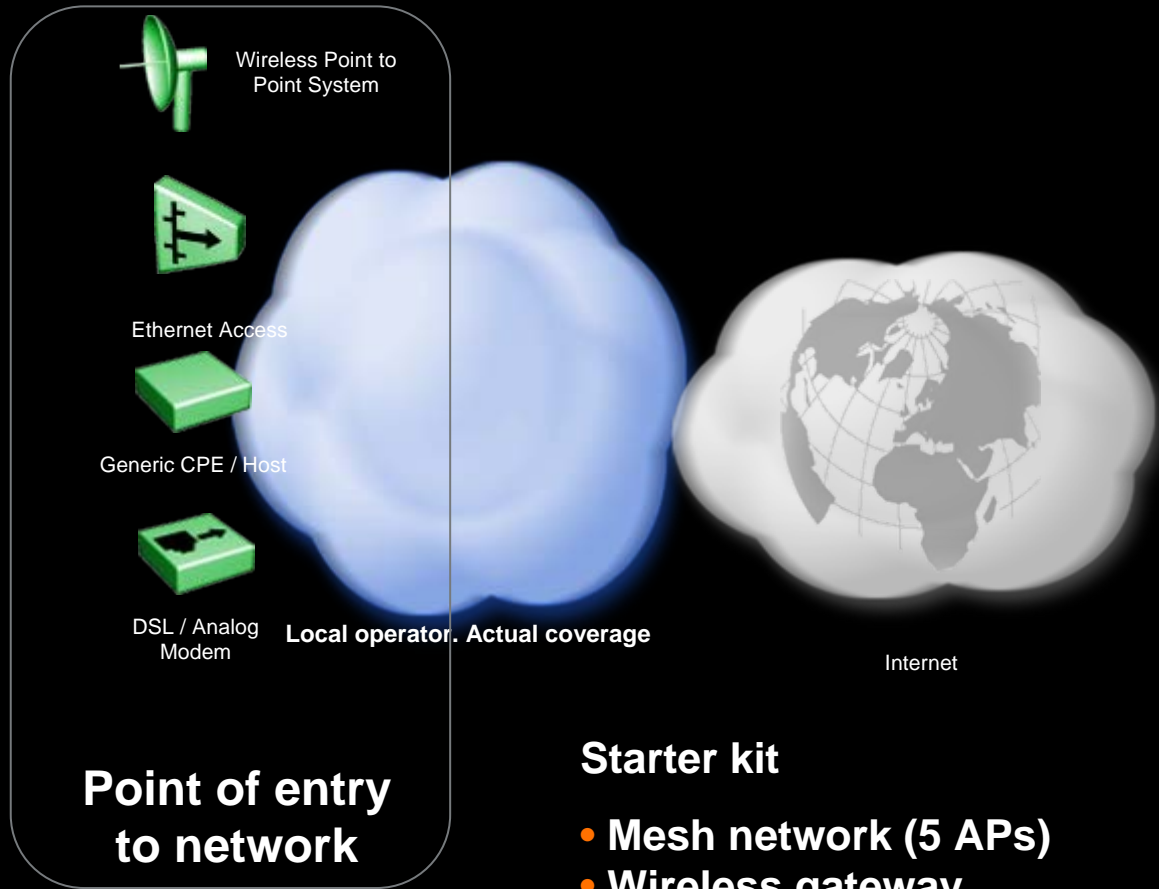
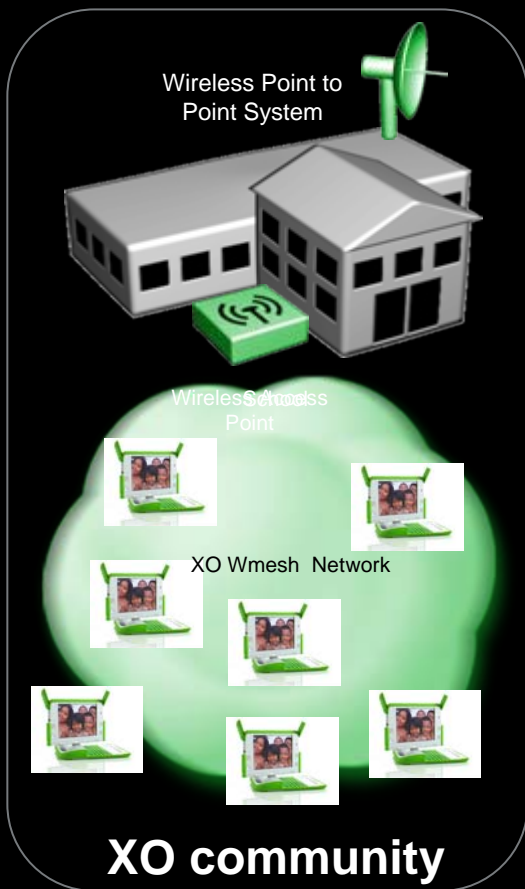
XO community in 3G/4G Network coverage





Scenario #2

XO community with no 3G/4G Network coverage



Starter kit

- Mesh network (5 APs)
- Wireless gateway
- 20 XOs
- 3G Modem

Nepal



Open Learning Exchange Nepal (OLE), Project OLPC

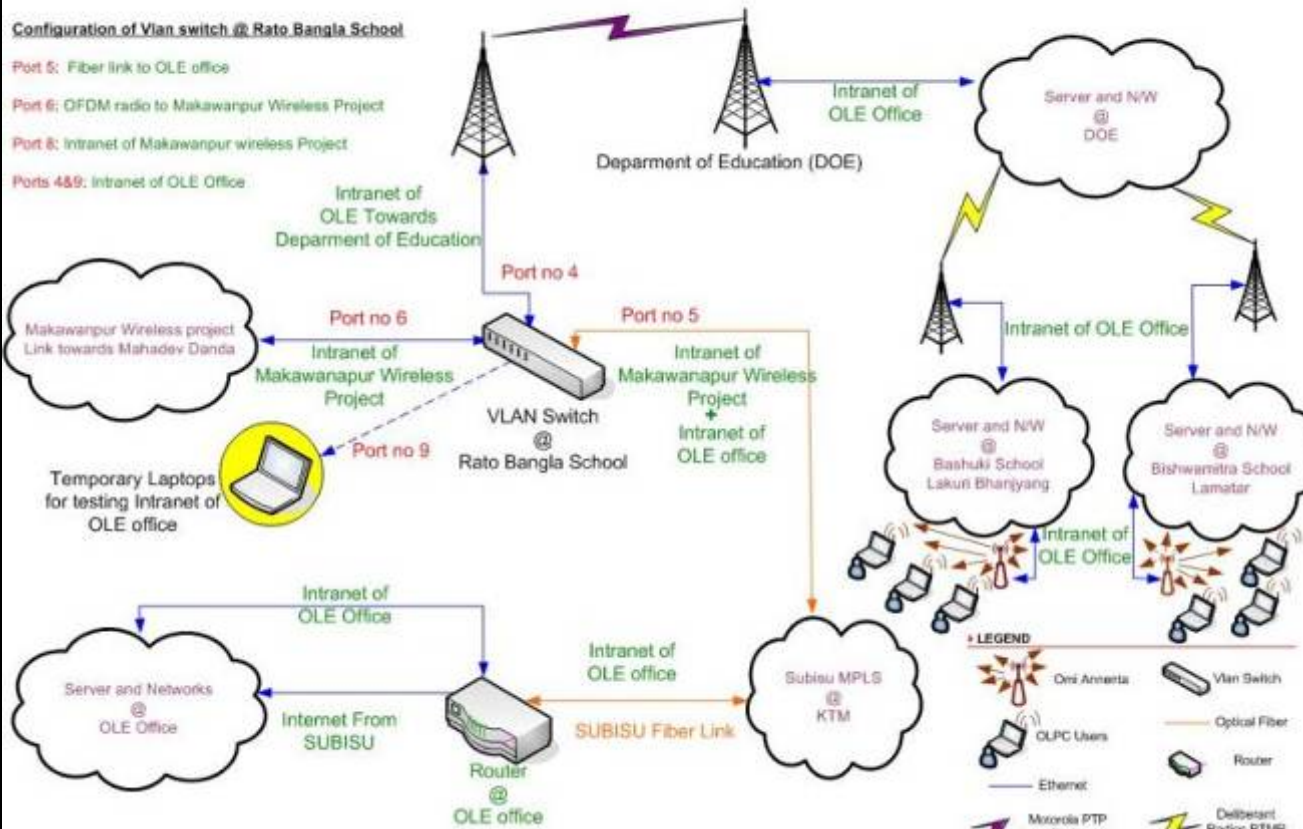
Configuration of Vlan switch @ Rato Bangla School

Port 5: Fiber link to OLE office

Port 6: OFDM radio to Makawanpur Wireless Project

Port 8: Intranet of Makawanpur wireless Project

Ports 4&9: Intranet of OLE Office



<http://blog.olenepal.org/index.php/archives/272>

http://wiki.laptop.org/go/Bishwamitra_Journal



Relevant Links

- OLPC: <http://www.laptop.org/>
- LearnIT: <http://www.nortellearnit.org/>
- Curriki: <http://www.curriki.org/>
- NTSA: <http://www.nortel.com/prd/academy>
- Mesh FOSS: <http://open80211s.com/>



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Business made simple