One Laptop Per Child

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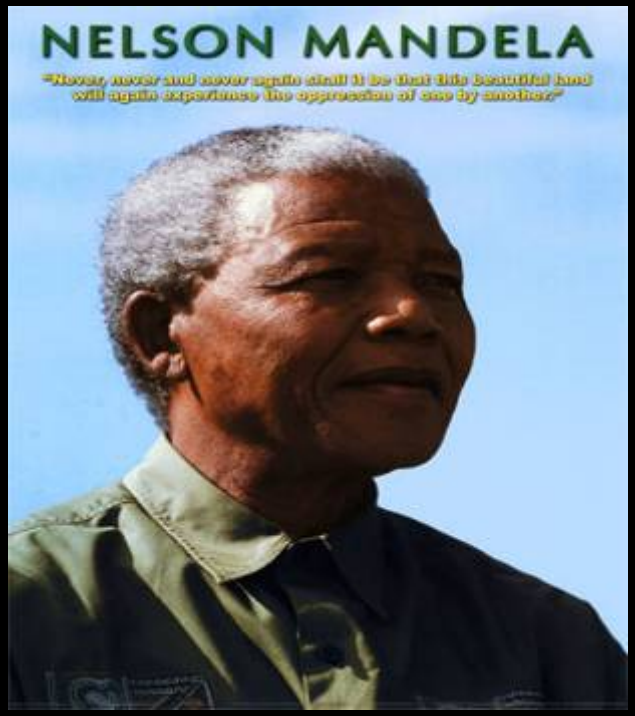
NORTEL

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

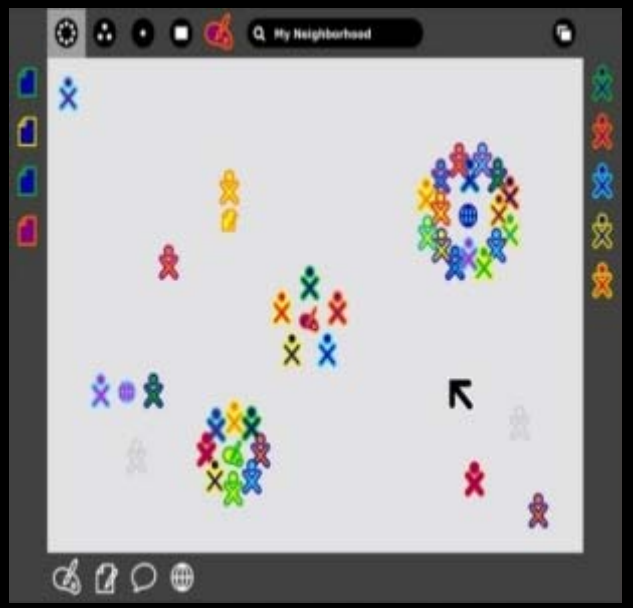
- AMD LX-Geode CPU at 700 MHz and 256 MB of RAM
- No hard disk. 1 GB flash memory
- Specialized LCD screen (Monochrome and Color mode) for saving power
- Built-in wireless network interface
- Color camera

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

NORTEL LearnIT

Curriki Global Education & Learning Community

Education Solutions

Nortel 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

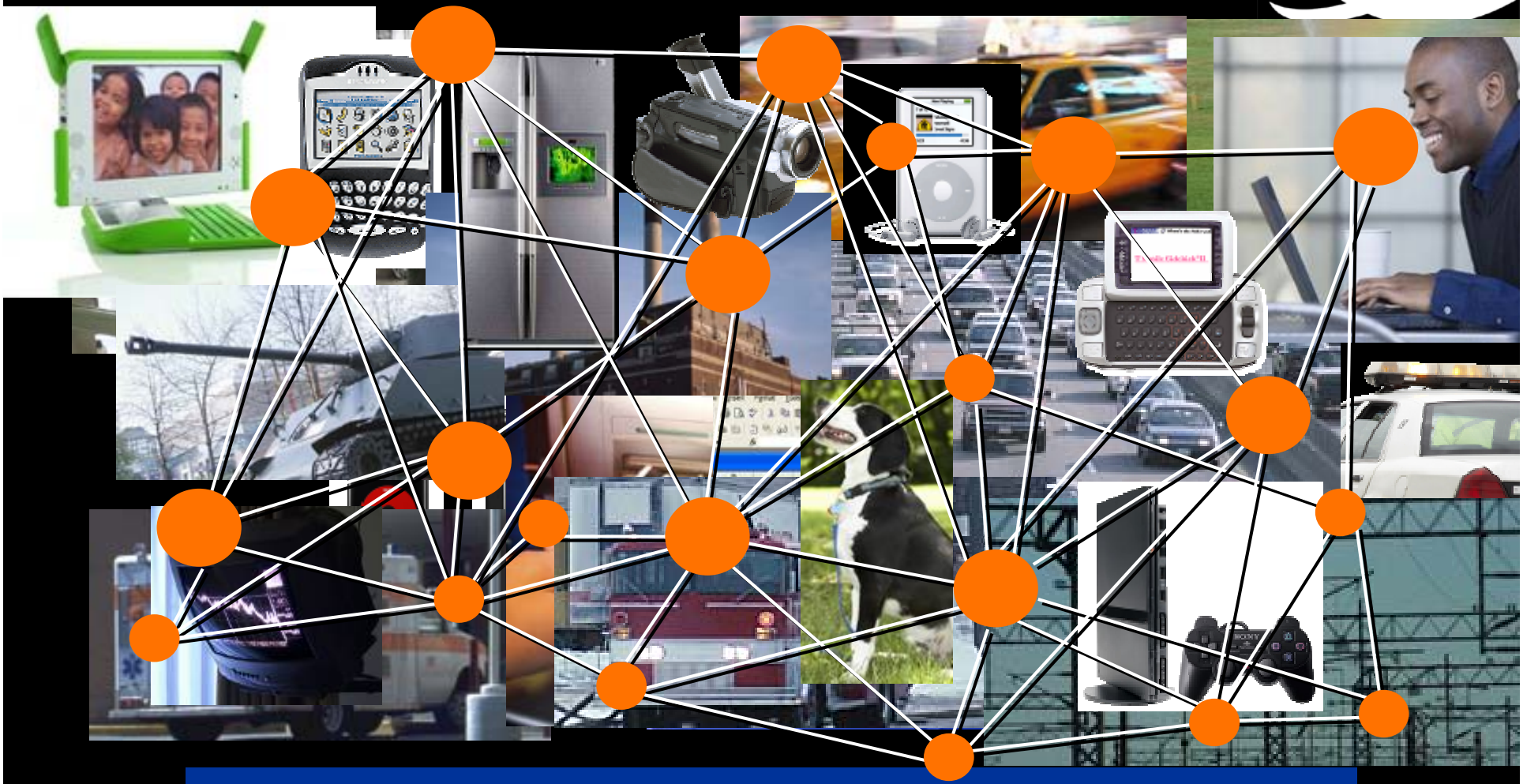
Global Classroom
(Students can interact with students anywhere in world)

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

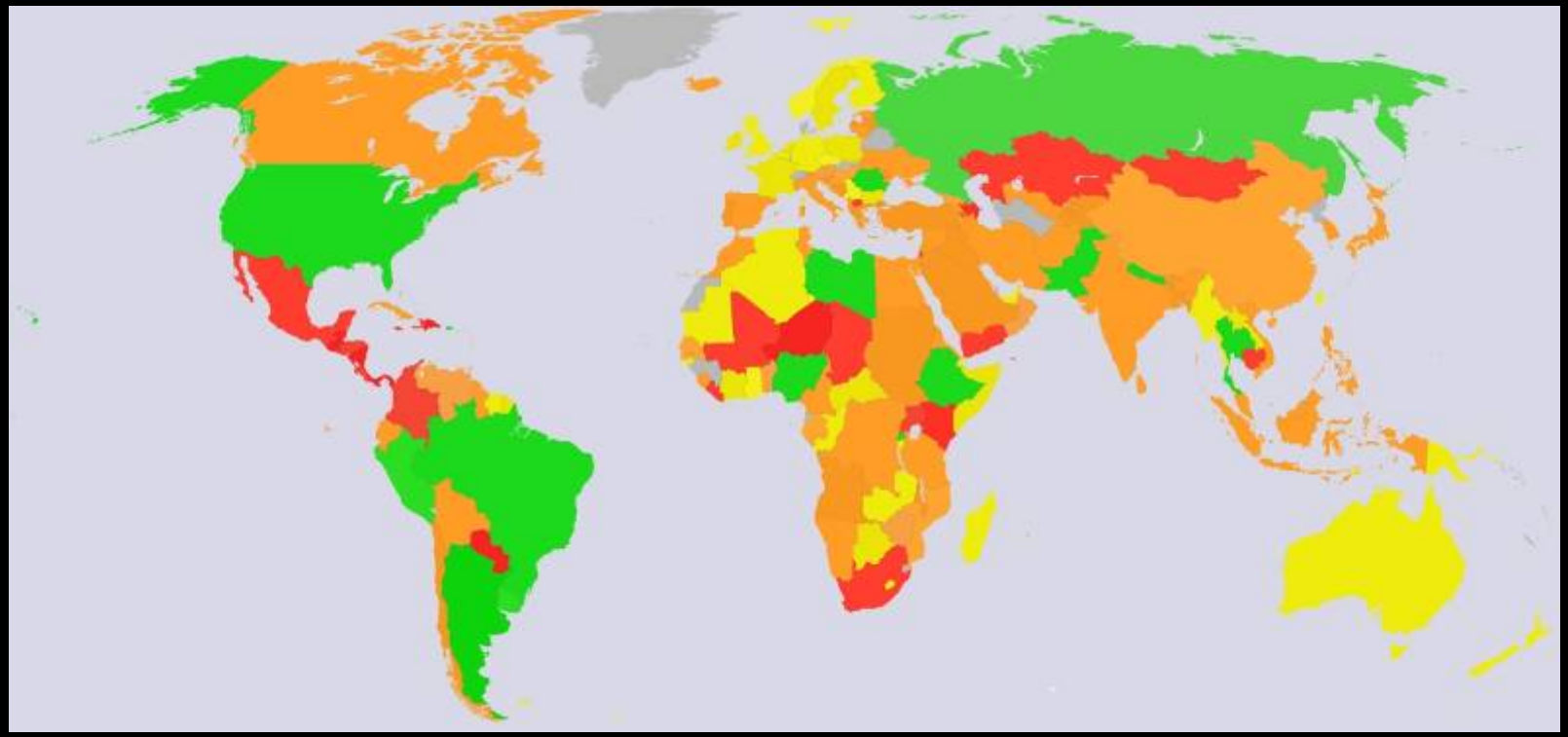
Brazil

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



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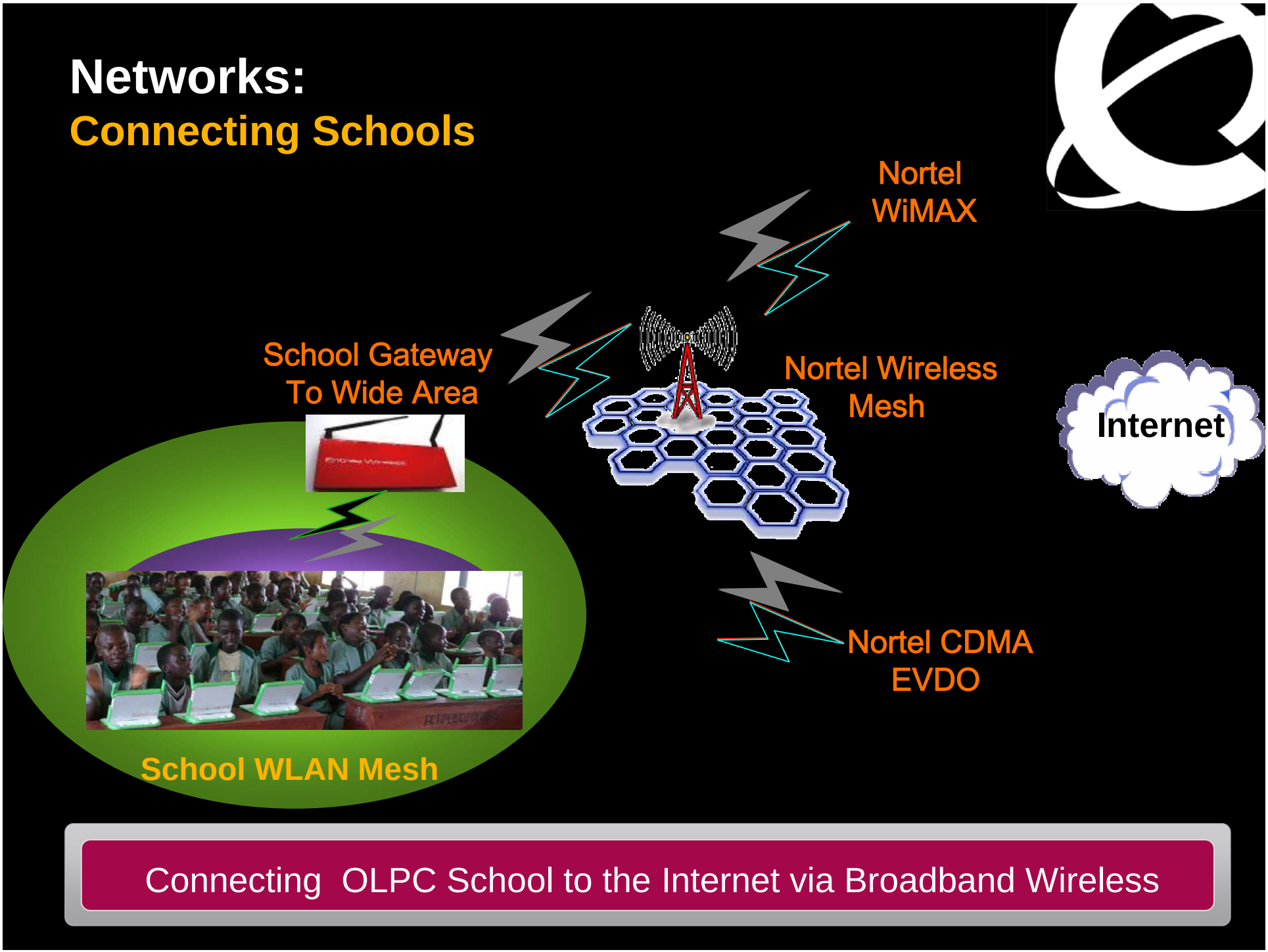
Networks:
Connecting Schools



Connecting OLPC School to the Internet via Broadband Wireless

Networking Scenarios

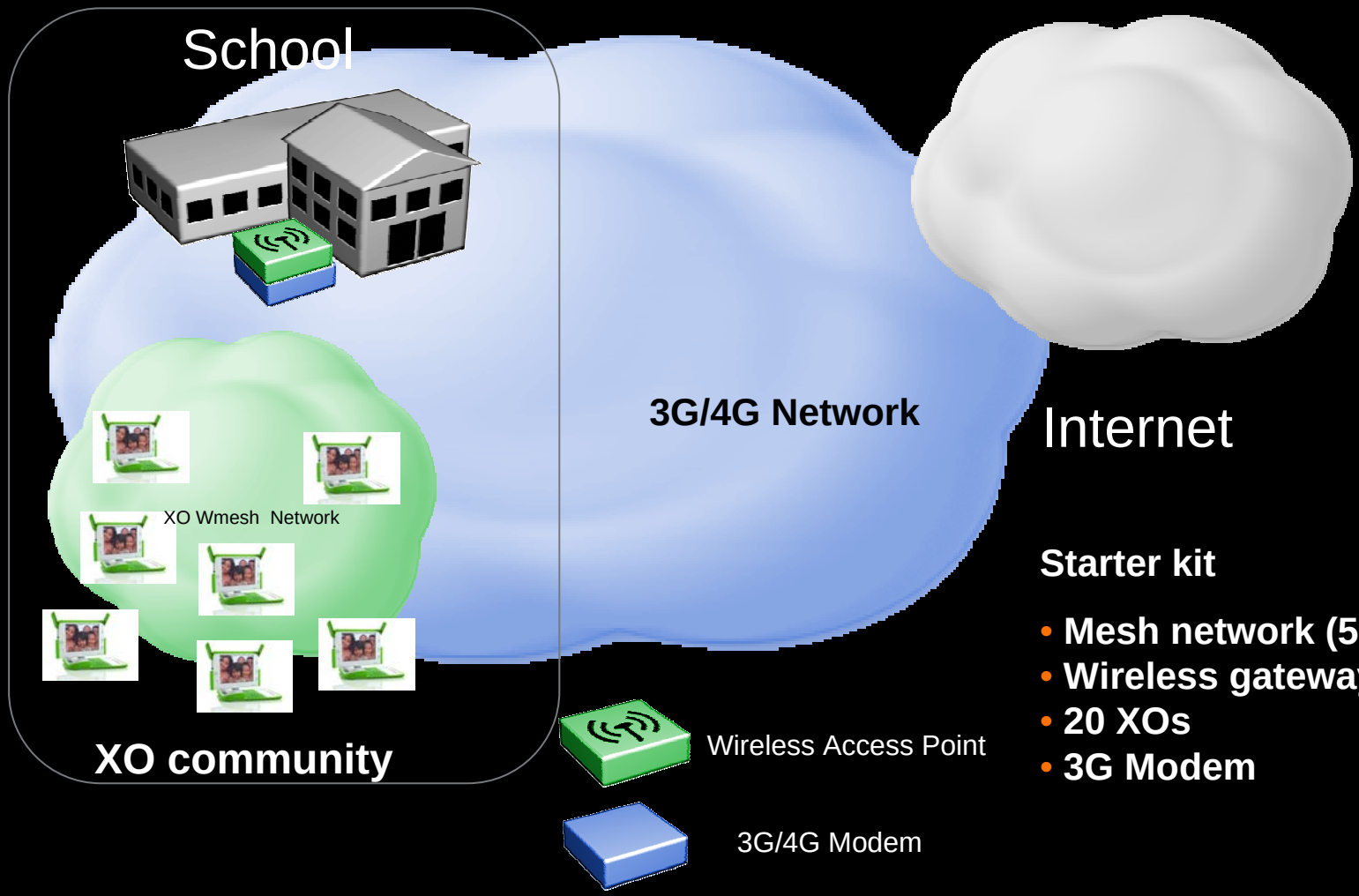
Scenario #1

- XOs 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

- XOs 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 act as a top up and offload point for the XOs in the region
    - The solution would focus on the equipment required for the tertiary educational facility and to connect that facility to the internet

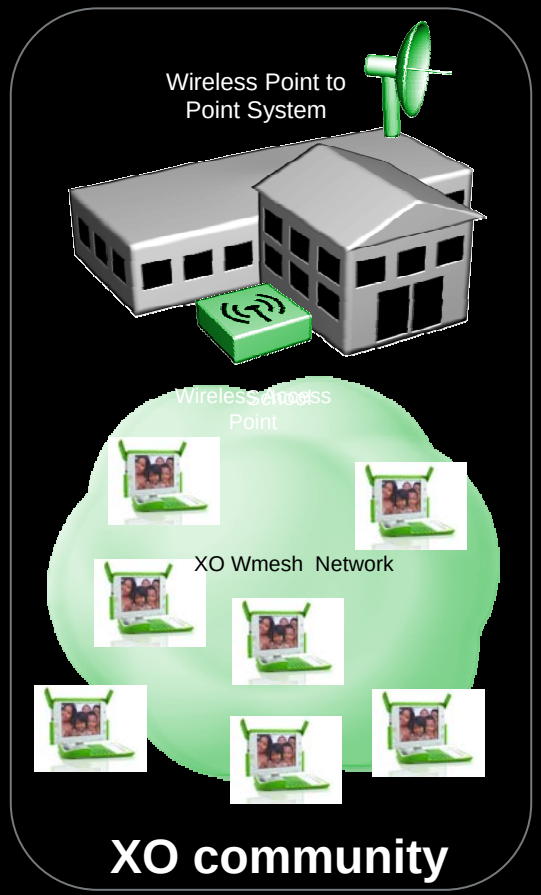
Scenario #1
XO community in 3G/4G Network coverage

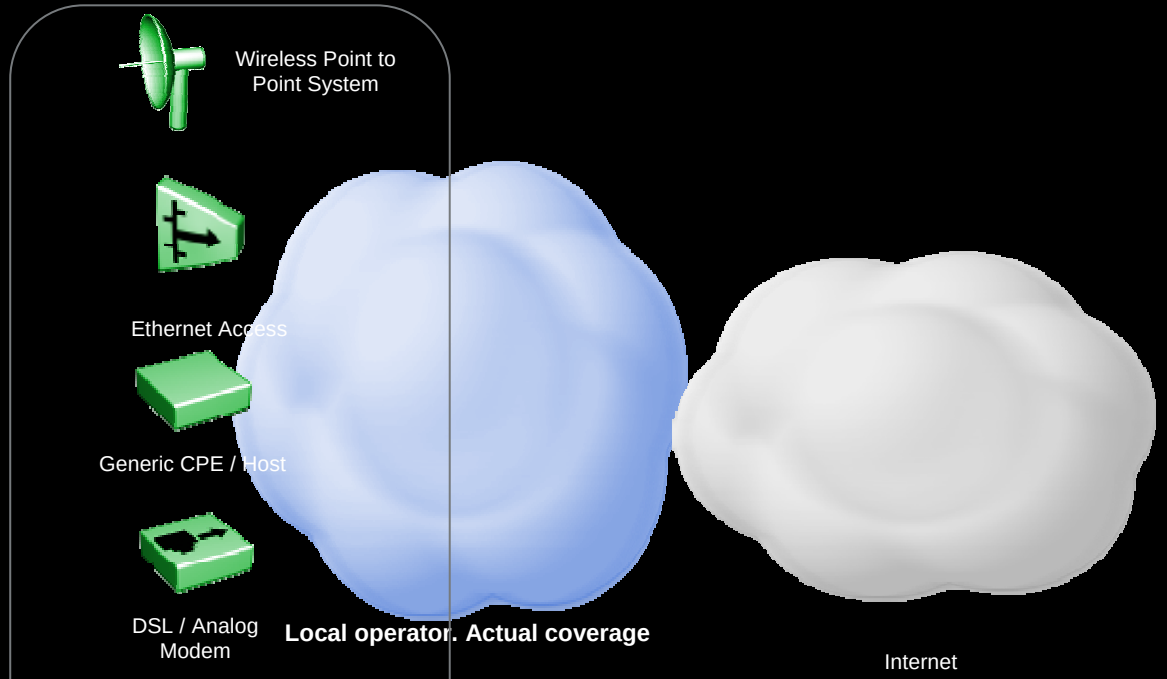


Starter kit

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

Scenario #2
XO community with no 3G/4G Network coverage



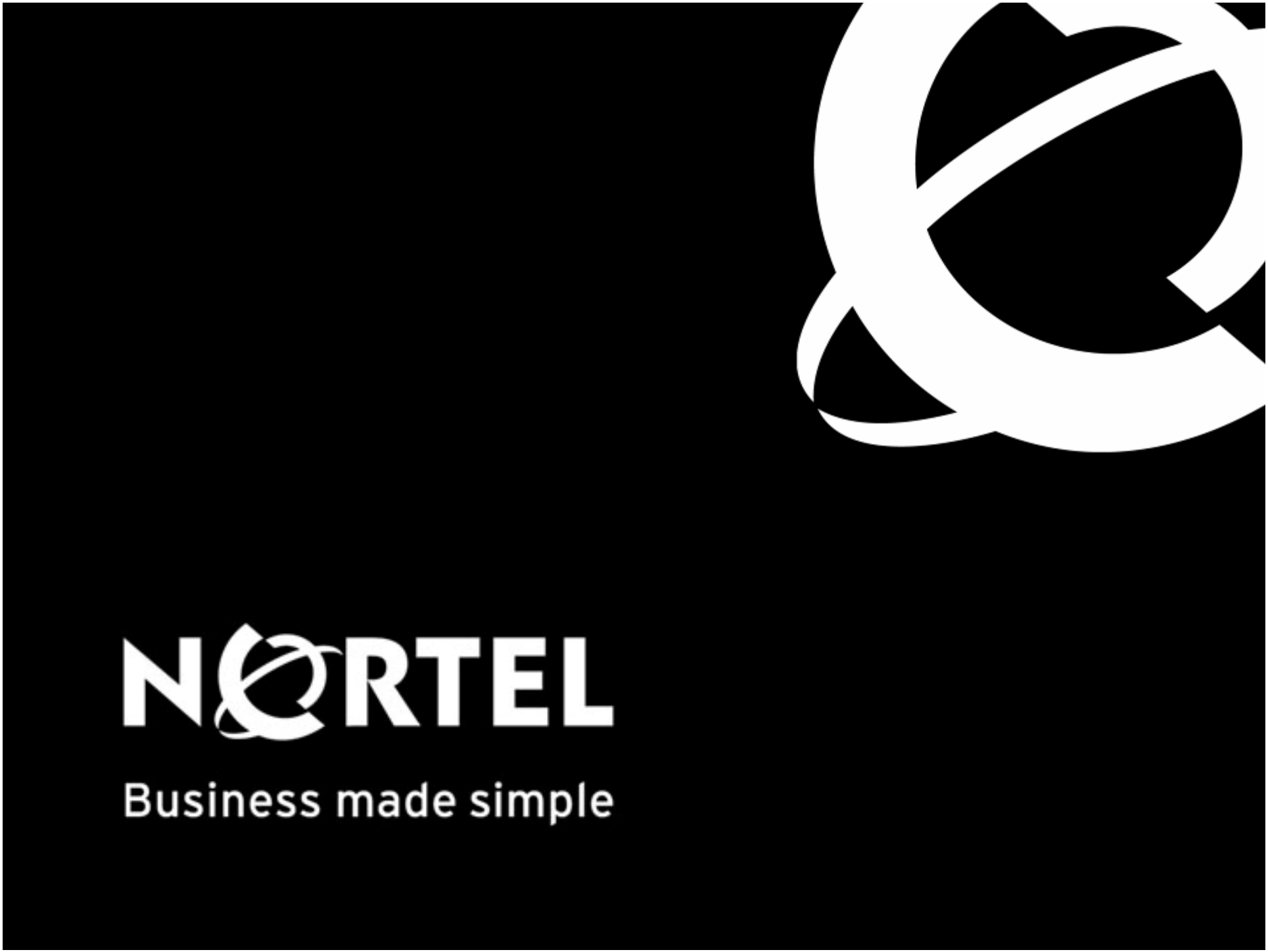


Starter kit

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

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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