

# EWB at SCALE8x

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*Israel Lopez – February 16, 2010*

## Engineers Without Borders

### What is Engineers Without Borders?

We are a non-profit organization established in 2002 to help developing areas worldwide with their engineering needs, while involving and training a new kind of internationally responsible engineering student. EWB–USA projects involve the design and construction of basic infrastructure projects including, but not limited to water, waste-water, sanitation, energy, and shelter systems. **These projects are initiated by and completed with contributions from the host community.** An emphasis is placed on education during the projects so that the host community is trained and can operate and maintain the systems without external assistance. In this way, EWB-USA ensures that its projects are appropriate and self-sustaining.

### And Orange County Professionals, what is their story?

Founded in 2007, the Orange County Professionals Chapter has three project communities in El Salvador, Honduras, and Kenya.

- El Salvador just recently completed construction of a water tank system that was part of a larger infrastructure project for a community lacking basic water access.
- Kenya is a bridge construction project, linking a community to a clinic across a river, the project is in the design phase, and is currently fundraising for implementation in the coming year.
- Honduras is an Education and Technology project, our goal is to implement a robust wireless network for a local NGO that runs three schools for the Juticalpa community

EWB-OC also runs local community efforts such as habitat restoration projects, local work with rotary. We also run an annual Corporate Challenge as a fundraising/awareness event. We are also mentoring Student Chapters in University of California Irvine, and CSU Long Beach.

## The Honduras Project

### What is the Honduras Project?

The Honduras project at its current state is a Wireless Infrastructure project for a network of three schools in the community of Juticalpa, Olancho, Honduras. We hope to provide them a robust network that allows them to collaborate internally as a school system, and communicate externally to new found contacts through the internet.

## Wireless Infrastructure... What does that mean?

Instead of using copper or fiber to physically connect communities, and buildings; rural Honduras mainly uses radios to connect homes, businesses and schools to each other and the internet.

## The Backstory

The school in 2007 had purchased radios and paid for a local vendor to implement a 802.11g wireless radio networks. They had installed the equipment, and left without much documentation or testing. About a year and a half later, the network which had now grown from 3 to 9 nodes had slowed down considerably, which was nearly unusable.

Our project Lead James McBryan, a Bay-Area Consultant, received a forwarded email from the 'Lead IT Power User' who was seeking IT assistance for his school's network. James traveled in 2008, returned, and formed the Honduras project in October of 2008.

## Assessment, how we know what needed to be fixed.

In April of 2009, we were granted permission to take a group of technology professionals, to make an assessment of the school's needs. We concluded that

1. Heavy Radio Network usage was causing interference
2. The Current Radio equipment was of marginal quality
3. Badly designed radio network

Our design addressed the three issues, by

1. Switching from Vertical Polarization to Horizontal Polarization (Think of Polarized Sunglasses & Glare)
2. Replacing current network radios with better higher quality radios
3. Move elements of the network to improve Line of Sight and simplify layout

## How much does the project cost?

Approximately \$10k, about 5k for Travel, and 5k of equipment

## What kind of Equipment?

- Ubiquiti Bullet2 – Wireless Radios
- Ubiquiti Bullet2HP – Wireless Radios
- Ubiquiti Nanostation2 – Wireless Radios (Some Donated by Ubiquiti)
- Horizontal Polarization Antennas
- Vertical Polarization Antennas
- High Gain Directional Antennas
- Routers, Switches, and Cabling
- Lightning Arrestors (Coax & Ethernet)
- WiSPY 2.4x Spectrum Analyzer (Donated by WlanMall.com!)

- Hard Drives (Donated by Western Digital)

### **How have you paid for the project?**

All of the members of the project help fundraise

- Personal and Friend Donations
- Corporate Solicitations (Cash & In-Kind)
- Social Networking
  - SpringSoft Flash Video Game
- Local Fundraisers (Café & Music event in San Francisco)

### **Who is traveling on the project?**

- Two Computer Professionals
- Two Mechanical/Structural Engineer
- One Electrical Engineer
- One Retired Project Manager
- Six Education Professionals from the University of San Francisco

### **How is your project sustainable?**

- We have carefully designed the radio network to impact the available spectrum as minimally as possible, preventing 'shouting-matches' (wherein everyone on the radio keeps increasing their power until nothing is heard!)
- We have chosen commercial hardware with good track-record in reliability and cost
- We have made sure to include spares with our implementation
- Local training at the University Next Door
  - Linux
  - Wireless Networking

### **We are at SCALE (Linux Expo) how does your project use Free Open Source Software (FOSS)?**

Great Question. Currently, it is a supportive and infrastructure role. We are:

- Providing VoIP Services to the three schools via Trixbox (Asterisk)
  - About 10 VoIP Endpoints
  - 30,000 Minutes since Installation in December of 2008-July2009
- Monitoring the current network via Cacti
- Typical LAMP Stack (Linux Apache, MySQL, PHP)
- We are using the Tomato Router OS to manage QOS at the internet presence

We hope to introduce some of the great FOSS Education Software Projects into the administrative/classroom setting.

## What are the Six Educational Professionals Doing?

The Educators from San Francisco will be giving us a report on how the school is doing. They will be first evaluating the school's capability, and then making recommendations to improve the curriculum. We are bringing them in because \_WE\_ are not educators and could not possibly our community recommendations on how to implement technology in the classroom.

They will be an integral process for future projects, software, networking, or other non-technology initiatives.

## How can I get Involved?

Right now we are in the middle of a project cycle, our next project cycle starts after we complete the wireless implementation. We will be doing more community needs research, and will return of potential projects that we can lead.

We would recommend you follow us via

Twitter: @EWBOC

Web: <http://ewb-oc.org/olanch>

Mailing Lists: <http://lists.ewb-oc.org/>

## What kind of people are you looking for?

- We are looking for passionate volunteers.
- People who can 2 to 6 hours of weekly commitments.
- IT Consultants, Wireless Network Engineers, Wired Network Engineers, Sys Admins, Programmers
- People with Business, Marketing, Project Management Experience
- People who are willing to travel
- People with Education Setting experience

## What is the future of the project?

- Incremental Upgrades & Maintenance Support of the Wireless Network
- Implementing Educational Software in the Classroom
- Advising the local contacts on Network Engineering
- Teaching local university students advanced Linux/Wireless Networking
- A new team will need to lead future projects

## Labdoo

### What is Labdoo?

Labdoo is a website/social-experiment whose goal is to use decentralized, social networking tools to efficiently bring excess laptops to the children in the developing world.

## **Why Laptops?**

Laptops are great tools of productivity and education. They are portable self-contained, and use relatively low power, perfect for a rural setting. In the developed world laptops are upgraded regularly and deemed out-dated; however using Linux one can refurbish a laptop that would be great for a child to use.

## **How can you get laptops to kids?**

We are partnering with humanitarian organizations like Engineers Without Borders to provide a community conduit, EWB has projects in developing countries, and Labdoo volunteers will have an inventory of laptops available for distribution to partnering schools/communities.

## **How can I learn more or donate a laptop?**

By visiting <http://www.labdoo.org>

We cannot accept a laptop here today, but on the website it has instructions on how to donate & get involved.

## **Is this tax-deductible**

At the moment donations are not-tax deductible

## **Who Runs Labdoo?**

Currently Jordi Ros (A Software Developer in Irvine) former member of Engineers Without Borders – Los Angeles, Israel Lopez, and James McBryan of the OC Chapter of Engineers Without Borders. Including help from EWB-UCI, the Springsoft Foundation, and Merci-Med.