

Lab 8: Mesh Networks with Babel

50.012 Networks

Hand-out: November 15
eDimension hand-in: November 22, 11pm

1 Objectives

- Lets try Ad-Hoc mode again this time
- Explore *mesh* networks with Babel
- Note: a permanent BabelNet ad-hoc network should be available in the lab for the next week

2 Experiments

2.1 Set up your machine

- Disconnect from the wired network, if you are connected, using the network-manager applet in the top right
- Install the script from eDimension folder: `bash install.sh`

2.2 Babel

- Babel is a loop-avoiding, distance-vector routing protocol for IPv6 and IPv4
- Its underlying mechanics are explained here:
 - <http://www.pps.univ-paris-diderot.fr/~jch/software/babel/babel-20140311.pdf>
- Babel will enable multi-hop routing on top of our ad-hoc network
- You should have `babeld` and `babelweb` installed on your lab machine
 - you can get them from <https://github.com/jech/babeld> and <https://github.com/kerneis/babelweb> otherwise
 - or use the install script
- Please connect to the AdHoc ad-hoc network
- Start Babel: `sudo babeld -g 33123 -D wlp3s0`
- Use wireshark with `babel` filter to look at exchanged traffic
 - Which network-layer protocol is used?

- What types of messages do you see? What are they probably used for?
- Check your routes using `route -n`, do you see the routes introduced by babel?

2.3 Babelweb

- Babelweb is a visualization interface for the local Babeld client
- `babelweb` should start the local server
- Use a browser to visit `localhost:8080`
 - You should be greeted by babelweb
- Try to answer the following questions:
 - What are the neighbours listed?
 - What are the routes listed? What does installed mean probably
 - What are the redistributed routes?

2.4 Announcing your Own Routes

- Using Babeld, you can announce other networks that are connected to your machine (similar to an AS and BGP announcements)
- So far, probably one redistributed route is listed, so only one subnet is known
- To change that choose an arbitrary subnet that you want to claim is connected to your `eth0` interface
- Assign an IP address in that subnet (X.Y.Z.Q) to your `eth0`: `sudo ifconfig eth0 X.Y.Z.Q netmask 255.255.255.0 up`
- Now kill babeld `sudo killall babeld` and restart it with:
 - `sudo babeld -g 33123 -C 'redistribute if eth0 metric 128' eth0 -D wlp3s0`
 - The `eth0` route should now be redistributed
- Check babelweb to see if your route is appearing in the redistributed routes
 - See if you can find the announcement in the wireshark traffic
 - Ask someone else in your Babel ad-hoc network to ping your `eth0`'s IP

3 What to Hand in

3.1 eDimension submission:

Please provide a writeup (in PDF format with your name) that includes the following information:

- Were you able to set up the small ad-hoc network at the start?

- What can you observe in the ad-hoc join traffic in wireshark?
- Why could we need a protocol like babel in addition to 802.11 ad-hoc mode?
- Which layer is babel operating in?
- Which network layer protocol does babel use?
- In babelweb, could you find out the following?
 - What are the neighbours listed?
 - What are the routes listed? What does installed mean probably
 - What are the redistributed routes?
- Which prefix (subnet) did you choose to announce? Could other people ping your eth0 interface in that network?

3.2 Checkoff:

- No checkoff required if you submitted your reply sheet