

Progress Report June 2018

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Objective

- To implement and deploy a robust uplink protocol that can make advantages of alternative up-link(s).
 - To investigate the communication pathways from existing AWS networks and analyze their challenges.
 - To explore alternative up-link(s) and protocols that can be used to design a more robust AWS network.
 - To implement and deploy a robust up-link protocol that can make advantage of alternative up-link(s) for improved reliability.
 - To evaluate to what extent up-link reliability is improved.

Current Work

- Objective 2 - To refine comments / supervisors
- Objective 3 - To study and implement routing scheme for supporting a decision on whether up-link is intermittent or not.
 - To setup an ad-hoc wireless network with AWS nodes using OLSR.
 - To include radio link interfaces into routing table to measure link cost based on RSSI and LQI.
 - To study RSSI/LQI thresholds, in relation to PDR.
 - To write down a report that partly will be developed into a research paper.

An experiment - OLSR Protocol

```
*** olsr.org - 0.6.6.2-git_0000000-hash_12fa41b5362519d37bea6715ce291978
(2014-09-11 13:09:19 on toyol) ***

--- 11:02:03.888672 ----- LINKS

IP address      hyst          LQ           ETX
169.254.7.17    0.000  0.819/0.611  1.994
192.168.32.41   0.000  0.983/0.921  1.102

--- 11:02:03.888703 ----- NEIGHBORS

      IP address  LQ      NLQ      SYM      MPR      MPRS  will
169.254.7.17    0.000  YES      NO       NO       3
192.168.32.41   0.000  YES      NO       NO       3

--- 11:02:03.888719 ----- TWO-HOP NEIGHBORS

IP addr (2-hop)  IP addr (1-hop)  Total cost
169.254.7.17    192.168.32.41   2.985
192.168.32.41   169.254.7.17    3.894
```

To be cont'd

- The following observations are considered:
 - Good quality of link can vary considerably over time, while bad links vary more below a certain threshold.
 - Radio signals which are received at the base station with low power are drown out by strong signals from other links (limited quantization resolution).
 - The nodes suffers from high routing delays which results in a high number of packet loss.
 - OLSR should be modified to include radio links into routing table and measure link costs based on RSSI and LQI.

Achievements and Future Plans

- An academic papers:
 - “*Status of Existing Weather Observation Station Network in Tanzania and the Possibility to Automate and Densify*”. AFRICON2015
 - “*Benchmarking the Robustness of Cellular Up-links in AWS Networks*”. Journal of Communications and Network (CN)
 - “*On Exploring Classification Scheme in RSSI-LQI Metrics Thresholds in WLAN-3G/4G Integrated Networks*” - to the next ACM conference 2018
- The following future plans involve activities and associated milestones:
 - To secure tuition fee
 - To implement radio link costs (RSSI/LQI) in routing table.

Thank You