crowdbeamer

present anywhere, anytime
new functionalities serving business opportunities

GOALS

- crowdbeamer Wifi improvements
  - Radar channels
  - External antennas
  - crowdbeamer network
- Experience improvements
  - Internet access QoS
  - Voting
  - Serving larger audiences
- Testing lab and portable testbed
- Demos at conferences
  - Copenhagen
  - Athens

CHALLENGES

Give an answer to client demands

- Find new/other concepts
  - No progress with ath10k
  - Open WRT not compatible with implemented cb-software
- Realize a network
- Introduce internet without image loss

FROM CB GO & ES → ES+ → PRO AV

GO & ES
Same casing

ES+

- ES+
  - 4 external antennas
  - No or smaller battery

ProAV

- ProAV
  - Robust device
  - Professional connectors
  - PoE / 220 V
  - Daisy chain: power / PoE / ethernet
  - Mountable
  - Antennas: fixed or flexible installation (4,5 m)

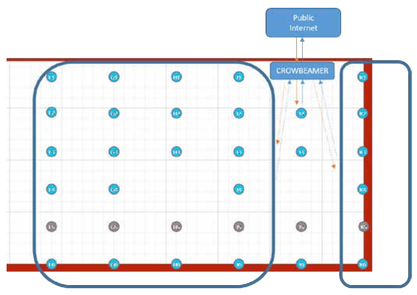
RESULTS

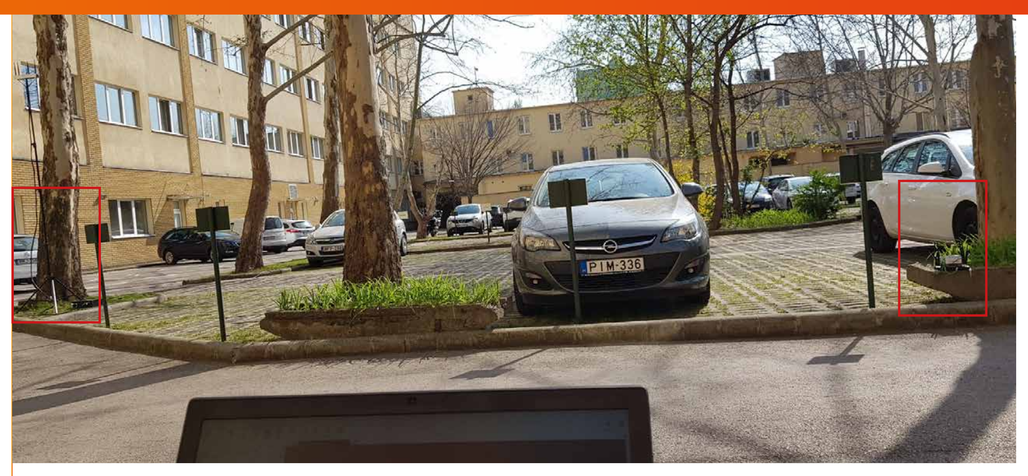
TEST 1: INTERNET ACCESS @ W-ILAB.T

- 1 device connected to crowdbeamer Wifi
  - Step 1: ↓ large file & video stream → no impact
  - Step 2: ↑ large file & video stream → impacts video stream
  - Conclusion: firewall rules → limit outgoing traffic
- 30 devices connected to cb-Wifi
  - Step 1: 30x ↓ large file & video stream → impacts video stream
  - Conclusion: limit for both
    incoming (download)
    outgoing (upload)

Solution: allow basic access while being connected to cb Wifi

- Use traffic shaping software to limit
  - Upload: limit fixed network interface 3Mb/s
  - Download: limit wireless interfaces: 10 Mb/s
- Use 802.11ac





TEST 2: INCREASE WIRELESS RANGE @ BUDAPEST

Conclusions Budapest tests

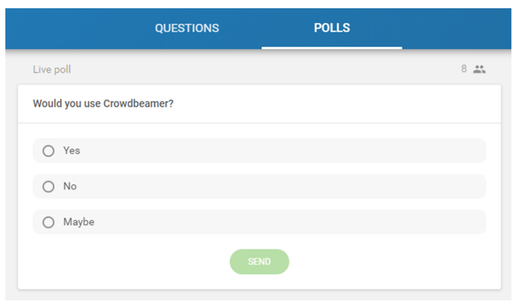
- Lots of fluctuations: human body
- RSSI decrease directly below antenna → antenna not too high (2,5 m)
  - Lowest = -70
  - Ok → 40 m radius
  - Better than internal
  - Same results as w-iLab.t
  - Conference room empty 40m

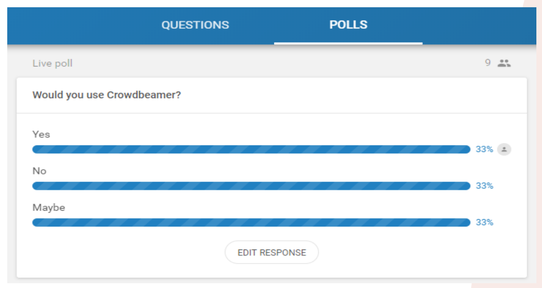
MORE RESULTS

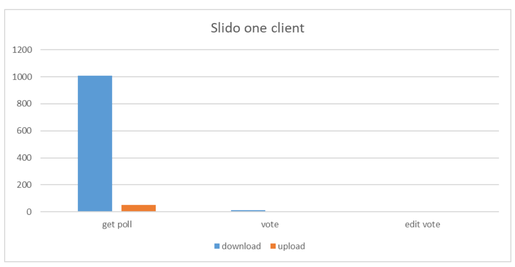
TEST 3: ANALYSIS OF SLIDO VOTING @ W-ILAB.T

One wireless client in the w-iLab.t testlab was used as a client of the crowdbeamer. We analyzed the traffic that was sent to/received from the SLIDO server when interacting with a poll

After making a vote, the current standings are sent to the clients



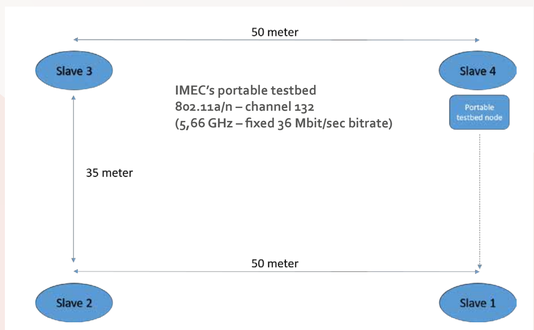


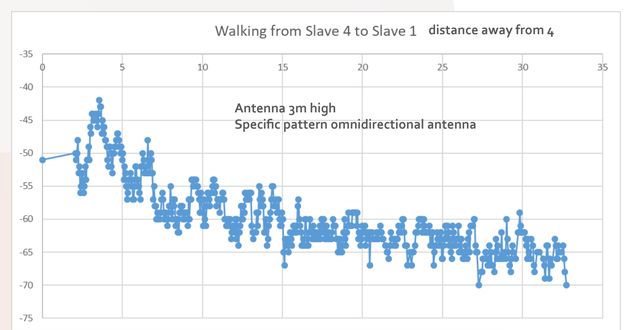


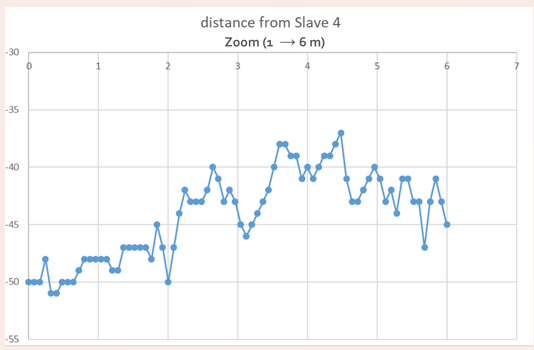
100 clients	(MB)		
	get poll	vote	edit vote
download	100.8	1.3	0.33
upload	5	0.5	0.15

Results:
100 clients → 100 Mb → 80 sec (ideal)
Possible solutions

- Optimize SLIDO (get the poll)
- Increases download speed and evaluate
- Limit the number of users
- Look at other voting platforms







CONCLUSIONS

- Wifi is core technology for crowdbeamer
- TESTBED at Ghent University and mobile installation is crucial in testing cb
  - New functionalities
  - Quality
- Flexibility & simulation facilities from clean to real life (with or without people)
  - Testbed
  - Mobile
- Evaluation: combi of numerical elements & visual inspection
- Feedback: from reality to "clean environment" & vice versa
- Future: more complex situations – added features – interaction with primary functionality: streaming

TODO

SCALING TEST OF SLIDO @ W-ILAB.T

- Use iperf traffic generator to generate the same amount of packets (of the same size) as SLIDO to see if the voting feature doesn't influence the video quality
- Further research on minimizing download packets

ROAMING TESTS @ W-ILAB.T

- Tests again in wilab2 and limit transmit power
- Check when mobile device roam
- Need for managed Wifi-network: roaming <-> stay connected as long as possible to original AP