MANIAC Challenge 2013

@ IETF87 in Berlin, July 27-28, 2013

The Mobile Ad hoc Networking Interoperability And Cooperation (MANIAC) Challenge

Goal

- Better understand cooperation & interoperability in ad hoc networks
- Mix practice using real hardware & theory analyzing generated data sets

Format

- Competition between teams of developers
- Participants form ad hoc network with mobile devices, carry data traffic
- Organizers operate monitoring backbone of access points

Previous Events

- MANIAC@Globecom'07, MANIAC@Percom'09 (concept from Virginiatech)
- Focus was on real-time and non real-time traffic forwarding in a MANET

MANIAC Challenge 2013

Mobile Data Offloading

- Offload infrastructure via customer ad hoc forwarding using handhelds
- Incentive for customers: discounted monthly fees
- Incentive for operators: decreased infrastructure costs

Recursive Per-Packet Auctions

- Up-stream node offers forwarding opportunity for a given max budget + fine
- Downstream nodes bid to get custody of the auctionned packet
- Focus: study/testing of auction strategies, bidding strategies

Cooperation between operated networks & spontaneous wireless networks?

Maximizing connectivity (at small cost)

- Operator infrastructure offloading
- Coverage extension
- Resilience of the network in face of outage

Cooperation between operated networks & spontaneous wireless networks?

Maximizing connectivity (at small cost)

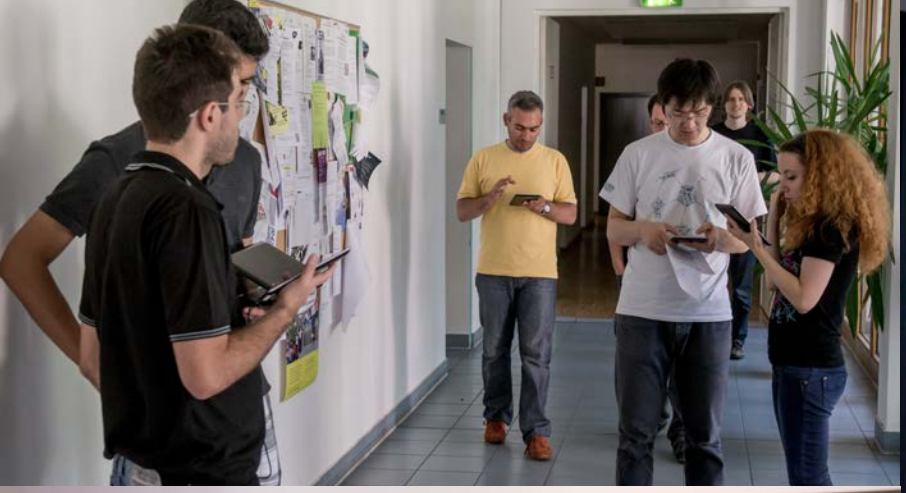
- Operator infrastructure offloading
- Coverage extension
- Resilience of the network in face of outage

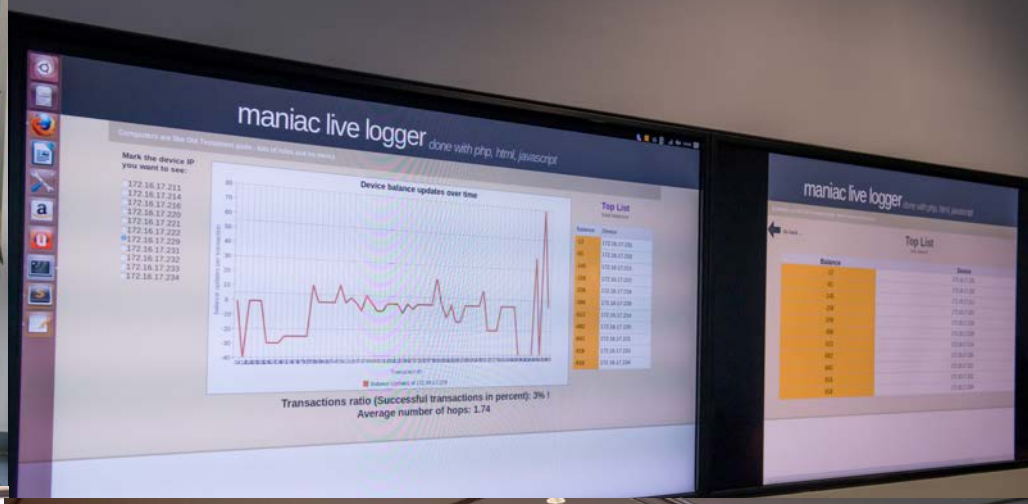
- Should be **mandatory** just for this last reason!
- Solutions are available **now** providing *some* services.
- Do we need a **public debate** about this?

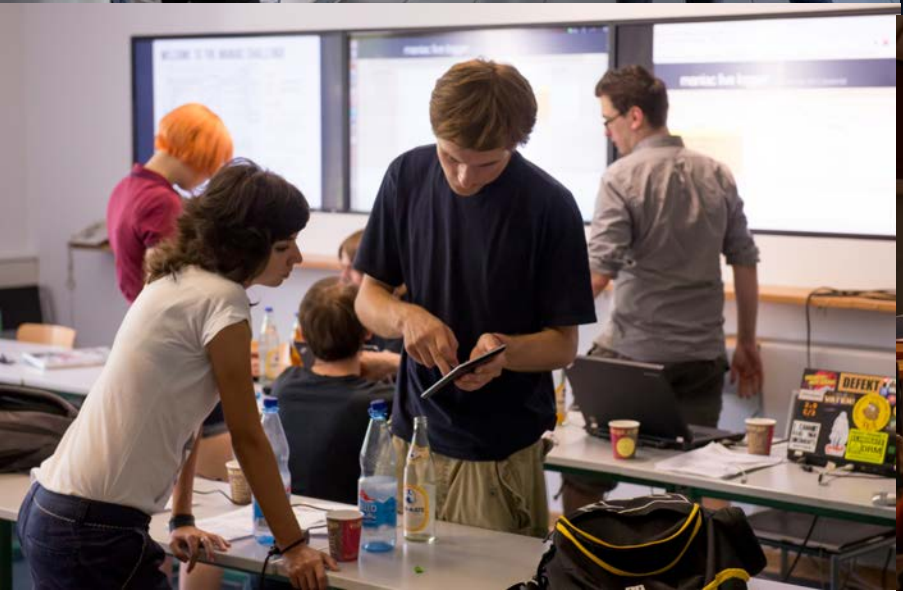
Participants & Forwarding Strategies

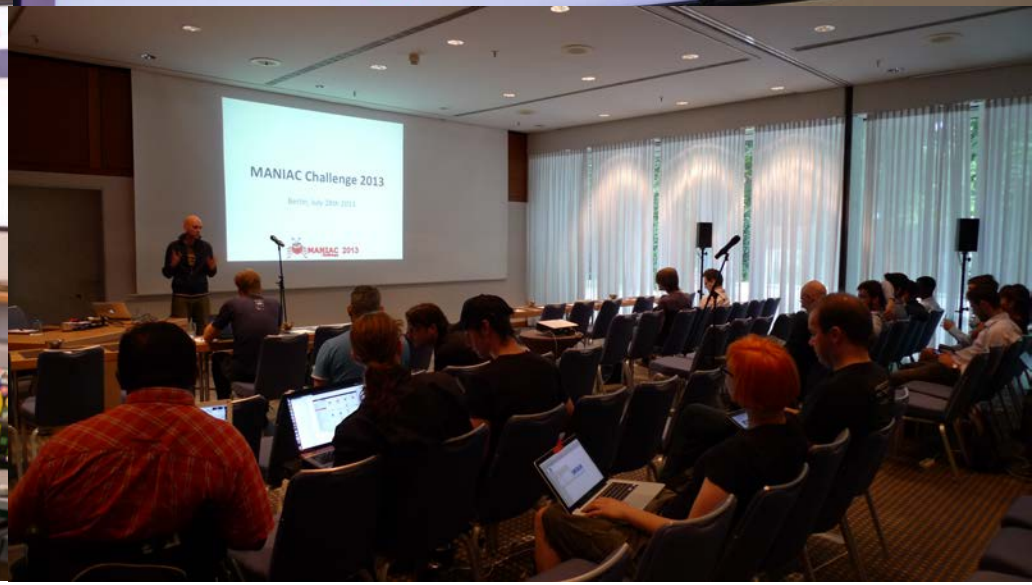
– 5 teams, 3 continents:

- Predictive greedy strategy
- B-Maniac strategy (based on Bayesian network)
- Path tightness strategy (based on graph analysis)
- No-regret learning strategy
- The wolf-pack strategy (based on taxing ‘rich’ nodes)







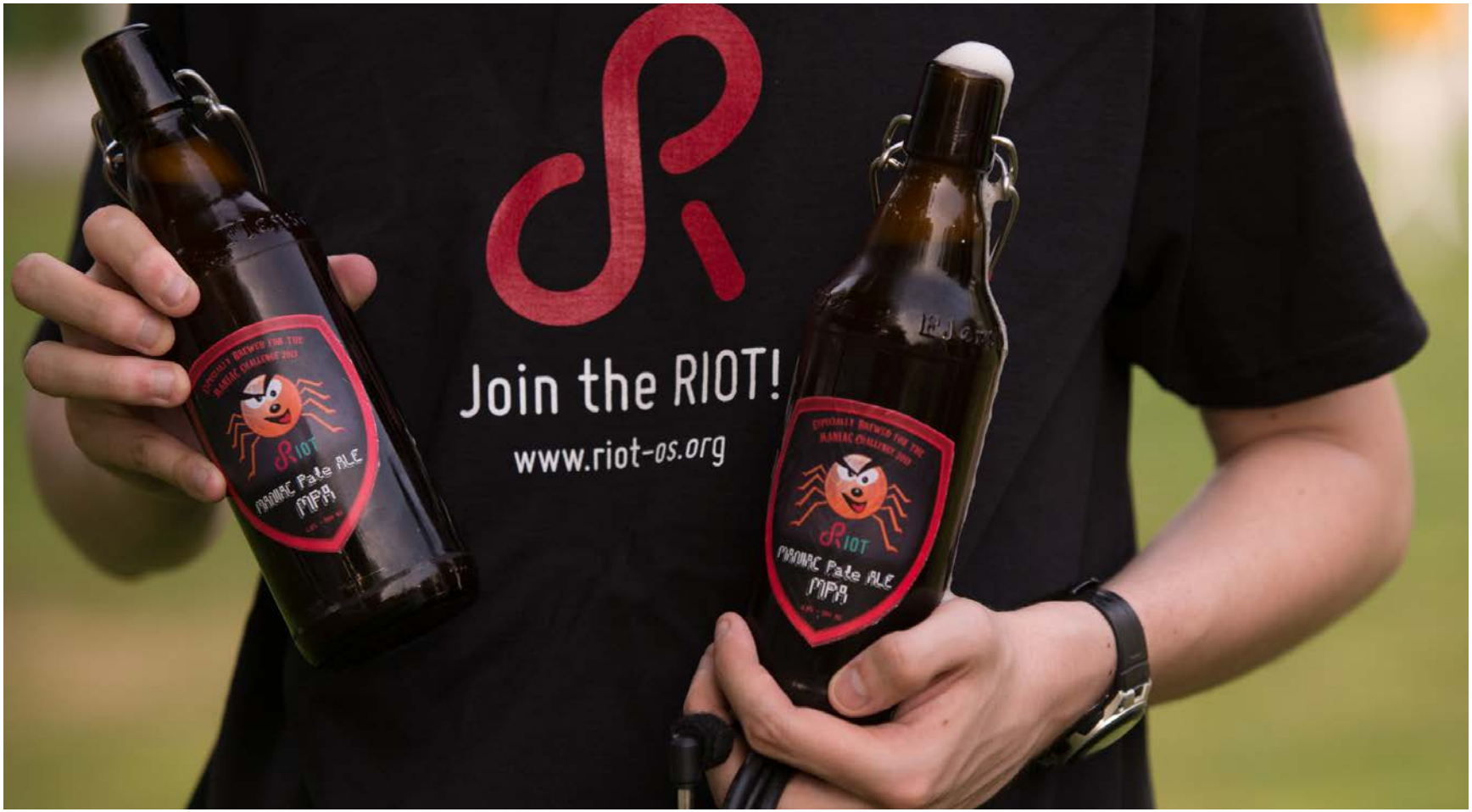


Code: github.com/maniacchallenge

Web: 2013.maniacchallenge.org

MANIAC 2013 Challenge

(Social) Offloading



MANIAC 2013 Challenge

Key Findings

- Wifi drivers incompatibility (still!!!)
- olsrd port issues on Android
- Heterogeneous strategies can lead to negative resonance
  - Training/learning phase convergence
  - Blackhole formation (packet dropping)
- But it's fun!

Wishlist
(for Spontaneous Wireless Networks)

- More radio bandwidth
- Optimized MAC layers
- Appropriate IP protocol suite
  (work in progress ;)

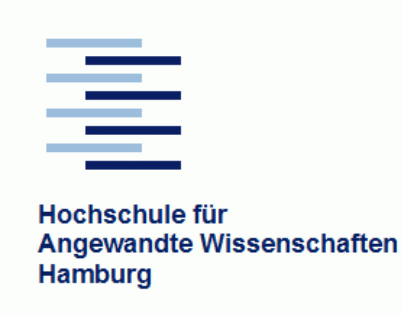
Special Thanks

- to the FU Berlin MANIAC API team:
  Fabian Brandt, Lennart Dührsen, Andreas Reuter,
  Tim Scheuermann, Lotte Steenbrink

  - *NUMB3RS*
  - *# Mails on internal list:* 639 (so far) = 10.3MB
  - *# Mails on participants list:* 113 (so far) = 667KB
  - *Repository-Size:* 707.71MB (more than doubled in the last 2 weeks)
  - *# Commits:* 884
  - *# Meetings before the GitLab crashed:* 13
  - *# Pages in the wiki:* 34
  - *# Number of cookies eaten during coding sessions:* FATAL: Integer Overflow
  - *# Of people who left the project before the challenge:* 3
  - *# Commit messages containing "fix" or "error":* 114

Special Thanks

- to sponsors & support:



MANIAC Challenge Awards

- **Performance Award** for balance + PDR
- **Strategy Award** for most compelling concept

And the Winners are …

Performance Award

And the Winners are …

Performance Award

Isaac Supeene (University of Alberta, Canada),
René Steinruecken (TU Hamburg, Germany),
Asanga Udugama (Bremen University, Germany)
for their predictive greedy strategy based on fine grained neighbor node profiling.

And the Winners are …

Strategy Award

And the Winners are …

Strategy Award

Gabriel Kalejaiye, Joao Rondina, Leonardo Albuquerque, Tais Pereira, Luiz Campos , Raphael Melo, Daniel Mascarenhas and **Marcelo Carvalho** (University of Brasilia, Brazil) for their graph analysis strategy driving towards more cooperation and less network ressource utilization.