Flexub: Dynamic Subscriptions for Publish/Subscribe Systems in MANETs

Engineer Bainomugisha², Koosha Paridel¹, Jorge Vallejos², Yolande Berbers¹, Wolfgang De Meuter²

¹DistriNet, KU Leuven, Belgium
²Software Languages Lab, Vrije Universiteit Brussel, Belgium
Pub/Sub Systems for MANETs

- Dynamic Topologies
- Bandwidth-constrained
- Energy-constrained Operations
- **Massive number of messages**

**Currently:** Limited support to dynamically modify, re-issue or cancel subscriptions
Flexub: Dynamic Subscriptions for Pub/Sub Systems in MANETs

• Allows the subscriber to express a condition when to reissue or cancel a subscription

• Three subscription mechanisms
  – Continuous subscription
  – Subscribe once
  – Subscribe once and again
Dynamic Subscriptions in Flexub

Subscribe once and again until the cab’s capacity is reached.

Subscribe once: subscription is automatically cancelled after the first weather notification.

Continuously gets notified whenever there is an interested passenger to join a game.
Expressing Subscriptions in Flexub

Example: **Subscribe once and again** until the cab’s capacity is reached.

```java
Subscription cabSubscription = new Subscription();
cabSubscription.topic = "cab sharing";
cabSubscription.content = //subscription details

Policy subscriptionPolicy =
new SubscribeOnceAndAgain([cabCapacity]()
{return (receivedMatchedEvents<cabCapacity)}));

Flexub.subscribe(cabSubscription, subscriptionPolicy);
```
Evaluation: Simulations

• Flexub is implemented on top of Fadip
• Simulation setup:
  – OMNeT++ and MiXiM to simulate wireless mobile networks
  – 50 to 150 nodes in 1000 by 1500 meter playground
  – 20% randomly chosen publishers
  – 5% randomly chosen subscribers
Flexub and Network Traffic

Network Traffic (Lower is better)

![Graph showing network traffic comparison between Fadip, Fadip+Flexub](image-url)
Flexub and Workload on Subscribers

Total number of received events in subscribers by number of nodes with and without Flexub

![Bar chart showing the total number of desired events by subscribers, received by subscribers in Fadip+ Flexub, and received by subscribers in Fadip.](chart.png)
Conclusion

• Flexub:
  – Reduces network traffic
  
  – Improves the expressiveness and the flexibility of subscriptions
  
  – Subscriptions specify a condition under which a subscription should be automatically reissued or cancelled