Application-Aware Self-Optimization of Wireless Mesh Networks with AquareYoum and DES-SERT

**AquareYoum** – Application and QoE-aware Resource Management for YouTube in WMNs

**Problems in Wireless Mesh Internet Access Networks**

1. **Increasing Traffic Heterogeneity**
   - Many browser applications
   - Application demands (bandwidth, delay, jitter, ...)

2. **Network Ignores Packet Content**
   - Application type & demands

3. **Time Variance**
   - Application demands (SVC, Skype,...)
   - Channel quality & interference

**Solution: Application-Awareness**

- **Building Blocks**
  - Run Application Comfort (AC) monitoring tool on clients
  - AC allows QoE prediction
  - Trigger resource management (RM) if AC bad
  - Select RM action dependent on network condition
  - Avoid QoE degradation

- **YoMo** monitors the YouTube AC = buffered video playtime

---

**DES-TESTBED**

- 150 Mesh-Routers distributed over 4 buildings on the university campus
- Hybrid Mesh-Routers with
  - 3 WLAN Interfaces (2x ABG, 1xBG)
  - 1 Wireless Sensor Node (868 MHz)
- Mobile Nodes
  - Can move to places where additional connectivity is needed
- DES-SERT
  - Distributed Embedded Systems
  - Simple & Extensible Routing Framework
  - underlay-routing on layer 2.5
  - OLSR, BATMAN, AODV, GOSSIP, ...

**DES-SERT**

---

**Interaction of Components**

**Demo Setup**

1. A node failure happens.
2. The routing protocol replaces the broken route.
3. The bandwidth of the new route is not sufficient, YoMo alarms Dory.
4. Dory triggers Forrest to move.
5. Forrest moves to the place of the broken node to provide a new route.
6. The routing protocol moves the flow to the new route

⇒ The YouTube video is not stalling...