Some Considerations on Routing In Particular and Lossy Environments

T. Clausen, U. Herberg
DODAG Construction

thomas@thomasclausen.org

http://www.thomasclausen.org
DODAG Construction

- Connectivity ↑ based on messages received ↓
DODAG Construction

- Connectivity \( \uparrow \) based on messages received \( \downarrow \)

- Objective Function:
  “The OF can guide candidate neighbor set and parent set selection, as discussed in [I-D.ietf-roll-of0].”
DODAG Construction

- Connectivity ↑ based on messages received ↓

- Objective Function:
  “The OF can guide candidate neighbor set and parent set selection, as discussed in [I-D.ietf-roll-of0].”

- NUD:
  “...determines that a neighbor is no longer reachable .. MUST be removed from the routing table”

Reacting, rather than preventing, disaster

thomas@thomasclausen.org  http://www.thomasclausen.org
DODAG Construction

- Connectivity ↑ based on messages received ↓

- Objective Function:
  “The OF can guide candidate neighbor set and parent set selection, as discussed in [I-D.ietf-roll-of0].”

- NUD:
  “...determines that a neighbor is no longer reachable .. MUST be removed from the routing table”

Reacting, rather than preventing, disaster

http://www.thomasclausen.org

thomas@thomasclausen.org
Traffic Flow Support

Traffic:
Traffic Flow Support

Traffic:
Upward: common

DODAG, Parents

thomas@thomasclausen.org

http://www.thomasclausen.org

Thursday, March 24, 2011
Traffic Flow Support

Traffic:
Upward: common
Downward: rare
P2P: esoteric

DODAG, Parents
DAO, Source Routing,
Infinite Memory ...?
Traffic Flow Support

Traffic:
Upward: common
Downward: rare
P2P: esoteric
Broadcast: non-existent

DODAG, Parents
DAO, Source Routing, Infinite Memory ...

thomas@thomasclausen.org
http://www.thomasclausen.org

Thursday, March 24, 2011
Traffic Flow Support

Traffic:

Downward: rare
P2P: esoteric

DAO, Source Routing, Infinite Memory ...?
Traffic Flow Support

Traffic:
- Downward: rare
- P2P: esoteric

DAO, Source Routing, Infinite Memory ...?

thomas@thomasclausen.org

http://www.thomasclausen.org

Thursday, March 24, 2011
Traffic Flow Support

Traffic:
- Downward: rare
- P2P: esoteric

DAO, Source Routing, Infinite Memory ...

Utility meter reading?
Parameter setting?
Firmware updates?

thomas@thomasclausen.org
http://www.thomasclausen.org

Thursday, March 24, 2011
Traffic Flow Support

Traffic:
- Downward: rare
- P2P: esoteric

DAO, Source Routing, Infinite Memory ...

Utility meter reading?
Parameter setting?
Firmware updates?

All traffic bi-directional

Unfortunate Trade-off: infinite-state vs. source-routes
All sensors as destinations - topology update when errors?

thomas@thomasclausen.org
http://www.thomasclausen.org

Thursday, March 24, 2011
Utility Metering

Devil’s Advocate: “Why Not...?”
Utility Metering

Devil’s Advocate: “Why Not...?”

- AODV-like RREQ/RREP?
  - Manage state - appropriately spaced readings
  - Mass-reading - (optimized) flood + jittered replies
  - No source-routing, direct & short routes
  - ~37 pages spec, ~2000 lines of code
Utility Metering

Devil’s Advocate: “Why Not...?”

- **AODV-like RREQ/RREP?**
  - Manage state - appropriately spaced readings
  - Mass-reading - (optimized) flood + jittered replies
  - No source-routing, direct & short routes
  - ~37 pages spec, ~2000 lines of code

- **RPL:**
  - Source-routing or infinite state
  - >160 pages spec, >12000 lines of code

thomas@thomasclausen.org  
http://www.thomasclausen.org
Utility Metering
Devil’s Advocate: “Why Not...?”

- **AODV-like RREQ/RREP?**
  - Manage state - appropriately spaced readings
  - Mass-reading - (optimized) flood + jittered replies
  - No source-routing, direct & short routes
  - ~37 pages spec, ~2000 lines of code

- **RPL:**
  - Source-routing or infinite state
  - >160 pages spec, >12000 lines of code

*What answer to such “Why Not?”*

thomas@thomasclausen.org  http://www.thomasclausen.org