Transport for a Satellite Internet

Gorry Fairhurst
University of Aberdeen, UK

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What does Satellite Internet look like?

- Satellites are in space :-).
  - GEO, MEO, LEO - all more expensive to use than WiFi, but with much greater coverage.
  - Satellites cost money to build, launch and operate.
  - For LEO/MEO the satellite moves!
- All systems are evolving, and each system is different in the way it uses resources.
  - Might be Access, part of NTN, backhaul WiFi, etc.
  - Current solutions often depend on TCP-PEPs.

Why does TCP need a PEP?

- **Capacity**: depends on link budget, propagation, and radio resource management.
  - Signal (RF) propagation on line-of-sight to the satellite, weather, interference
    - This is a bandwidth/power tradeoff.
  - Some satellites connect (can be in different orbits and use different gateway terminals).
- **Packet Timing**: Burst of aggregated packets; access delay.
  - Might mean QoS differences between flows
- **Large BDP** (lots of packets in flight)

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  - Look for ways to reduce this, and still be safe (e.g., careful resume)
- ***Capacity*** might change (function of sharing, fade mitigation, satellite position, etc)
- ***Flow Control*** and app interactions matter....

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- In many cases the satellite terminal is ***not the last hop***, and that could be WiFi.
- *All of this is similar to cellular, but different.*

So what is needed from the IETF?

- Let's use ***Standard*** IETF protocols (no special PEPs, no special config)
  - ... needs correct protocol assumptions - CCWG or QUIC/TCPM/TSVWG?
  - Tolerant of Packet Timing variation - CCWG or QUIC/TCPM/TSVWG?
- Tell the network about what is actually needed (QoS) -TSVWG PANRG?
- MASQUE (complexity monster), and other authenticated methods … ?

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