Hypothesis

- Given the increasing integration of the Internet into the real world, it is worth revisiting its core design principles.

- The hardest problems to be solved do not derive from technical deficiencies but from a better understanding of real world requirements.
Three high-level tenets

- Design for change.
  - Not motherhood--it has costs.
- Controlled transparency and trust.
  - Unmitigated transparency is no longer workable.
- Acceptance of conflict of interest.
  - Design to tolerate tussle, not to resolve it.
A first topic--packets

- Our conclusion: fine-grained multiplexing is a good idea that has passed the test of time.
  - Design for change: +
  - Tussle: ?
- Missing: architecture for aggregates.
  - Triggers an erroneous call to replace packets.
- Later: the stateless faith
Security

- Need a new security architecture.
  - Disclosure and integrity among trusting parties is not the hardest problem.
  - Control of bad guys and what they do is.
    - Theft of service, denial of service, end-node attack
    - Communication among untrusting parties.

- Implication: must use degree of shared trust to regulate transparency.
  - Transparency: -
  - Packets (stateless) make it harder.

- Implication: must have an approach to identity.
The power of understatement

- The weak semantics of the Internet has benefited us.
  - Permits operation over diverse infrastructure.
  - Permits creative use of “raw” capability.

- This flexibility is eroding.
  - Drive to the common denominator.
  - Security.

- Trust-moderated transparency again.
Naming and addressing

- Separate location and identity.
  - Helps mobility: + (well known)(all kinds)
  - Hurts security: - (get over it)
  - Adds complexity: what names are needed for identity?
    - Thesis: a single, global, universal namespace of identities is NOT needed.

- FARA (a later talk) argues that this separation can be achieved.
An application perspective

- Study what they do.
  - They exploit generality.
  - But selectively.
  - They trade what they choose to exploit for the reach they achieve.

- Suggests a principle: accept that “non-general” nets will be attached to the edge of a general “Internet” core.
  - “Architect” this. Implies application-level state.
Help the application designer

- We don’t help the application designer enough.
  - Praising transparency is not much help.

- Help the application designer think about:
  - What transparency the app needs.
  - What is the desired scope of the app.
  - What naming and addressing is needed.
  - What is the “end to end” analysis.
  - What relay architecture is needed.
Reconsider the stateless faith

- We are drifting away. Design the future, don’t drift from the present.

- Issues:
  - Controlled transparency
  - Theft/allocation of service
  - Region structure

- Approach:
  - End-system reconstituted soft state.
    - Note: a tussle space
Note the unstated

- Things we took into account.
  - Mobility
  - Sensor nets

- Things we did not take into account.
  - An intermittently connected core.