

The background of the slide is a photograph of a beach at sunset. The sky is filled with orange and yellow clouds, and the sun is low on the horizon. Several palm trees are silhouetted against the bright sky. In the foreground, there's a pier or boardwalk with some structures and people walking. The overall scene is a classic beach sunset.

# UDP Options

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# Recent changes

- Option changes
  - Echo options
    - 9, 10
  - OCS integrates CCO
    - 16-bit negative of option area Internet cksum + length delta
    - Byte-swapped if not sum field isn't word-aligned
- Text extended
  - Rules for extending options
    - See next slide...
  - Inclusion and processing rules
    - ALWAYS: Drop options if OCS fails, but still deliver the body
    - RECEIVER DECIDES: Whether to require ANY option

# Design principles

*(per inclusion/processing rules)*

- Who decides what?
  - Senders decide what to add
  - Receivers decide what to require
  - Soft-state helps coordinate safe use of content-modifying options, e.g., AE
  - Ensures default is consistent with legacy

# Design principles

*(per inclusion/processing rules)*

- These are options, not encapsulations
  - Add to body, but not modify or depend on it
    - Exceptions include only LITE, AE, ACS
  - Do not depend on each other
    - Exceptions include only OCS, AE
  - Cannot declare order
    - Process in the order they occur
    - EXCEPT:
      - LITE always first if present
      - Then OCS (if present)

# Other issues raised (1)

- FRAG+LITE
  - Use UDP CS=0 to traverse misbehaving middleboxes
  - Copy UDP CS “style” in reassembly CS ‘style’ (honoring user configuration)
  - Reassembled payload has its own checksum (which can also be zero if desired)
  - This should affect UDP statistics as expected (act like one UDP packet in/out)
  - These are admittedly known to potentially affect legacy receivers packet counts badly
  - Reassembled packet already has the potential for UDP options after reassembly
  - LITE as specified avoids need for scatter-gather within UDP payloads during reassembly
- LITE (without FRAG)
  - May not traverse misbehaving middleboxes unless UDP CS=0 (but then the whole payload is LITE anyway)
  - OCS of the LITE area undermines “light” properties of the LITE area as separate
  - LITE as specified avoids need for scatter-gather within the payload for zero-copy

# Other issues raised (2)

- **Require/ignore flag**
  - Legacy receivers already ignore all anyway, so 'require' is meaningless without soft-state
  - Given soft-state, no flags are needed
- **Other uses of the surplus area**
  - Currently allow this to be used if not defined as an option
  - But then ALL BETS ARE OF (we don't ensure middlebox traversal, protect, etc.) – nor should we (they're not ours)
- **Other proposals have been considered before**
  - Fixed header (all options are optional)
  - Lack of a required OCS (UDP CS=0 is valid, so should OCS=0, but without wasting space)
  - Surplus area indicators are redundant with EOL
  - Attempts to provide a UDP header checksum (NAT would undermine)

# Pending changes

- **Typos:**
  - TLV description
    - OCS, NOP, EOL have implicit, predefined L
  - Option section numbering
    - 6 should be 5.11
    - 6.1 should be 5.12
  - OCS detail
    - Length now is 3 bytes; 1 byte T, 2 byte V
- **Middlebox traversal in Sec 12**
  - Update to explain that new OCS works only when remaining surplus is zero (but this is user choice)
- **Update LITE+FRAG discussion**
  - Force CS=0 even if user doesn't ask
  - User choice of CS=0/not should follow in use of reassembly CS

# For the future

- Cookie option
  - A separate draft, if desired