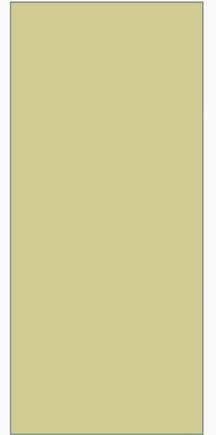# SPECIAL PURPOSE LABELS

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SPECIAL PURPOSE LABELS

- New name for **reserved** labels
  - The term "reserved" has a specific meaning to IANA
- Limited number of them
  - 16 set aside, 8 already allocated, one request in the pipeline (?)
- Need:
  - To prepare for exhaustion
  - To revisit process to allocate new SPLs
  - To create process to reclaim SPLs

EXTEND THE SPACE?

- Why not simply extend the range of SPLs from 0-15 to (say) 0-127?
- Nice, simple solution
- However, doesn't accommodate backward compatibility
  - Existing hardware doesn't treat a label of 16 as "special"
  - Existing software doesn't necessarily avoid allocating label 16 as a "regular" label

PROPOSAL: EXTENSION LABEL

- Use label 15 as the "extension label"
- A label following the extension label is to be treated as an **extended special purpose label** (ESPL)
- Backward compatibility: if current hardware sees label 15 at the top of stack, it should (will?) discard the packet
- This is the same behavior as for other unassigned special purpose labels (right?)

- If you know of implementations behaving differently from the above, please speak up!

EXTENSION LABEL

Questions:

1. How many ESPLs do we need?
   - Why put an artificial limit?
   - SHOULD try to allocate new ESPLs near 0 to help hardware
2. Is there special significance to an ESPL in the range 0-15?
   - Perhaps; see next slide
3. Should there be space set aside for Experimental and Private Use?
   - Done!

LABEL 7 (ELI)

- To simplify hardware, the Entropy Label RFC says that an LSR can simply scan the label stack to look for label 7, the Entropy Label Indicator
  - If found, the following label is an entropy label, and can be used for load balancing purposes
- This is a nice optimization
- However, if label 7 has a different meaning as an extended special purpose label, this would break

CHOICES FOR ESPLS 0-15

- Allow 0-15 as ESPLs, but state that they retain their original meanings
  - New ESPLs start from 16
- Disallow 0-15 as ESPLs
  - ESPLs start from 16
- Allow labels from 0-15 to have new meanings on a case-by-case basis (in particular, not label 7)
  - New ESPLs could start from 0 (nice from a table size PoV)
  - Chip and microcode implementors need to comment on whether implementations "peek" into the label stack looking for other SPLs (OAM? Router Alert?)

CHOICES

- Starting ESPLs from 0 may allow smaller ESPL lookup tables
  - Otherwise, the first 15 labels are "wasted"
  - How significant is this?
- Starting from 16 may make the logic/microcode simpler
  - Especially if there is more than one exception

- SPEAK NOW (or forever hold your peace!)

PROCESSES

- The draft goes into some detail on how SPLs (and ESPLs) can be retired
  - Please read and comment
  - Not urgent, but good to get right
- Need to put in a statement that ESPLs SHOULD/MUST be clustered near 16 (or 0)
- There was mild consensus not to have Private Use labels and to have a small Experimental space
  - Again, not urgent but good to get right
  - Note that the Experimental space is at the "end" of the label space. Not optimal for lookups, but shouldn't matter

NEXT STEPS

- Some good comments received on mailing list
  - Thank you! Will incorporate into new version
- Hardware/microcode developers should reflect on this draft and send comments (privately if they so desire)
  - Think about current implementations, backward compatibility and other issues related to existing SPLs
  - Also think about table size, ease of coding, etc. for ESPLs