Label Map Segmentation

DICOM WG 6

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Presentation of Final Text Draft to WG 6

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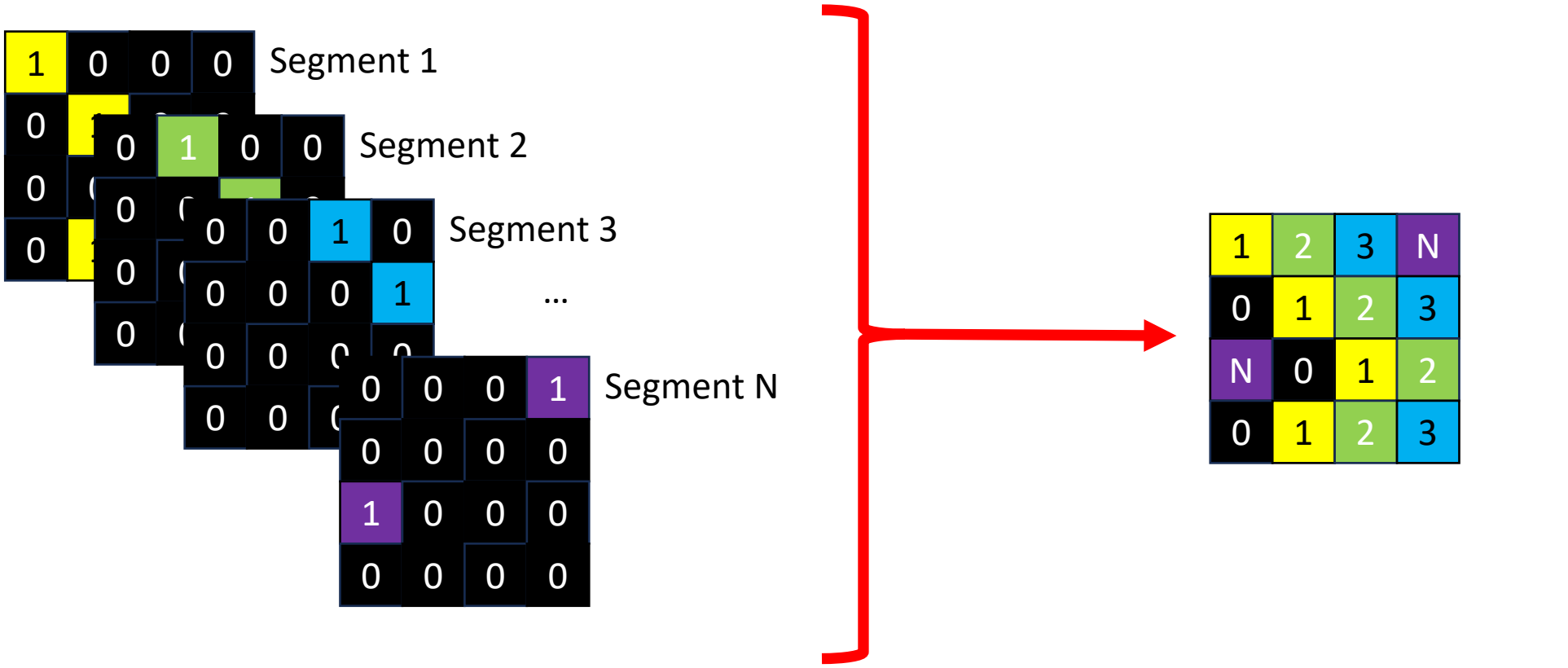
Various means of encoding segments

- Previously:
  - bitplanes encoding each segment (1 bit or fractional)
  - allows for overlap, even if uncommon
- Proposed:
  - label map, in which each pixel has index into segments
  - compact and efficient to process for non-overlapping use case
  - very common pattern in applications that create/use segmentations



Multiple non-overlapping BINARY SEG Frames

Single LABELMAP SEG Frame

Design Decisions

- Re-use as much of existing Segmentation IOD as possible
- New SOP Class
- Documented as multiple SOP Classes, same IOD
- Requirements conditioned on LABELMAP Segmentation Type
- 8 or 16 bit (not more)
- Segment Number not required to start at and increment by 1
- Color support through PALETTE COLOR Photometric Interpretation
- Background indicated by Pixel Padding Value
- If label maps overlap, separate instances are needed

Out of Scope (for this development cycle)

- More efficient description of instance rather than class segments
  - e.g., thousands (millions) of nuclei
  - without repeating segment sequence item describing category/property
- More segments than 16 bit unsigned pixel will support
  - 32 bit might be needed in future for lots of instance segments
  - Palette Color limited to 16 bits max at present
- Improvements related to Per-Frame Functional Groups Sequence
  - which gets bulky with lots of frames
- Relationships between segments
  - A contained within, overlaps, B, etc.