WBU-ISOG
MPEG-4 HDTV
CONTRIBUTION CODEC

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- Developments in High Definition Contribution
- Why Consider AVC for High Definition Contribution?
- Adoption of AVC for HD Contribution Strategy
- Bandwidth availability
  Fixed and semi-permanent links
  AVC for High Definition News
- Progressive or Interlaced
- Conclusions

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Developments in High Definition Contribution

The following are major factors in HD contribution :-

- *A significant move towards HD programming*
- *Greater compression efficiency demanded by broadcasters*
- *Greater use of file-based production techniques*
- *Availability of more transmission bandwidth*
- *A desire for reduced workflows*
- *Support for multiple play-out platforms*

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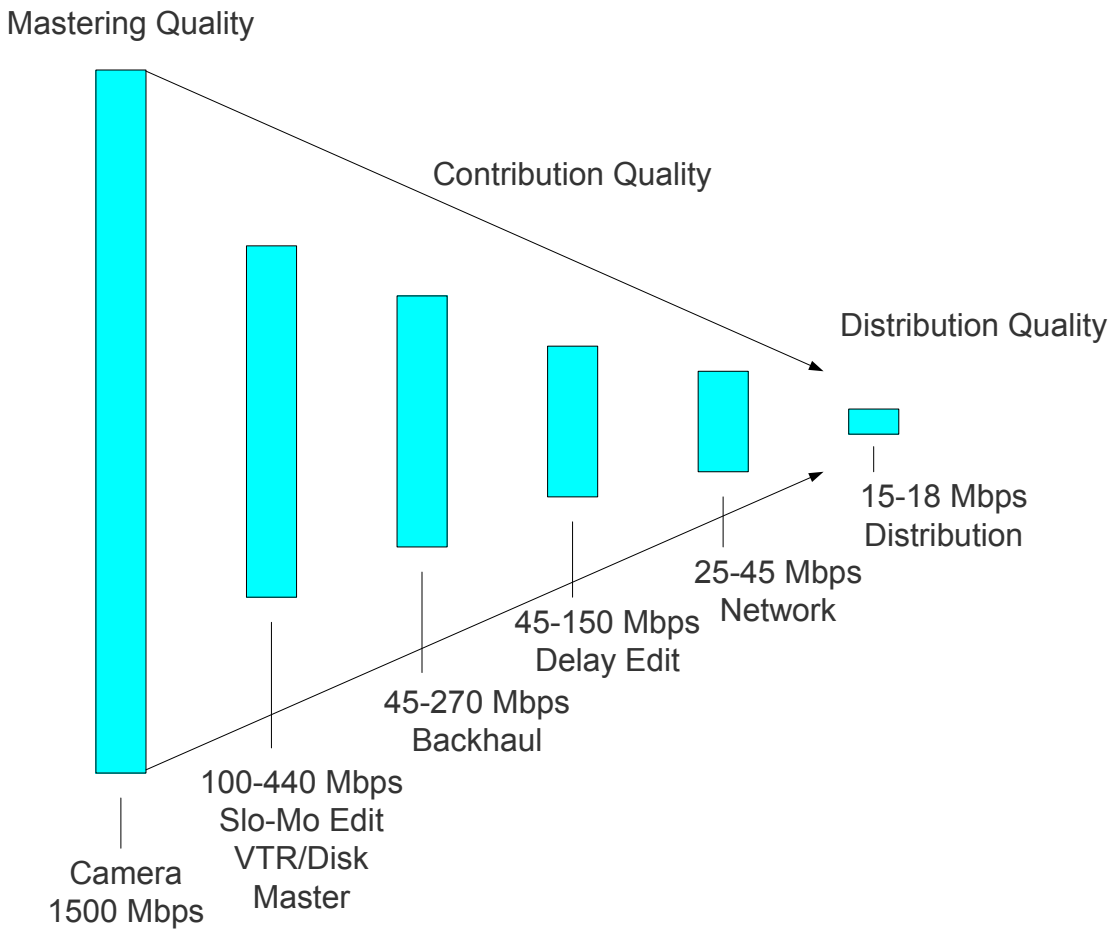
Developments in High Definition Contribution

The current MPEG-2 HD Scenario :-



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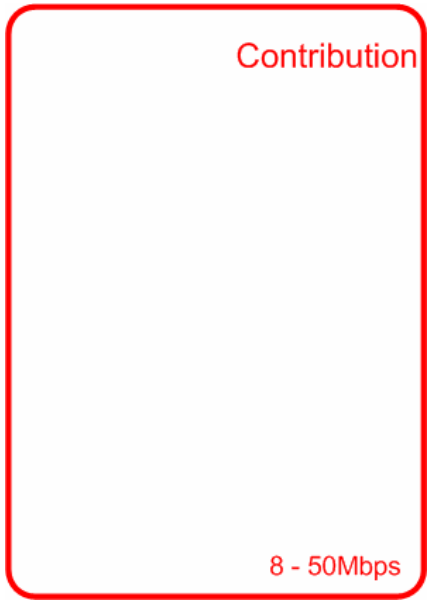
Why Consider AVC for High Definition Contribution?

Range of bit rate for Contribution: 8 - 50 Mbps



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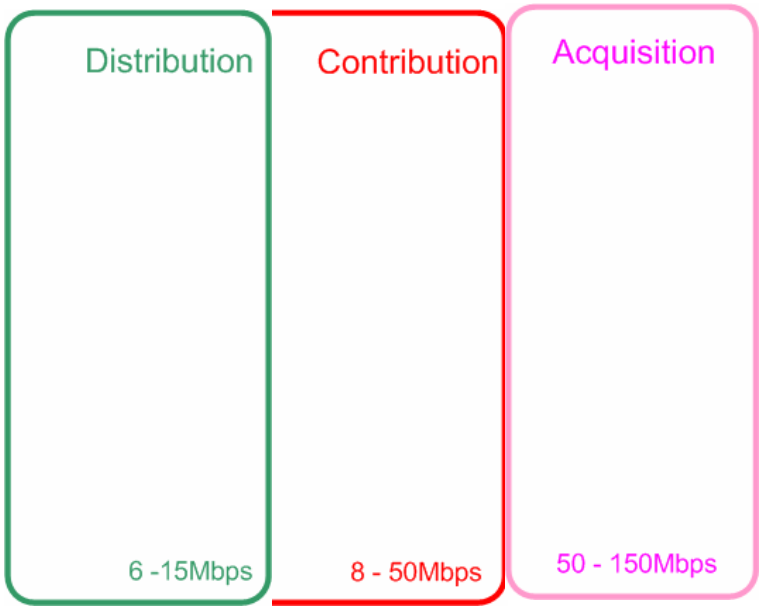

Range of bit rate for Acquisition: 50 – 150 Mbps

Distribution: 6 – 15 Mbps

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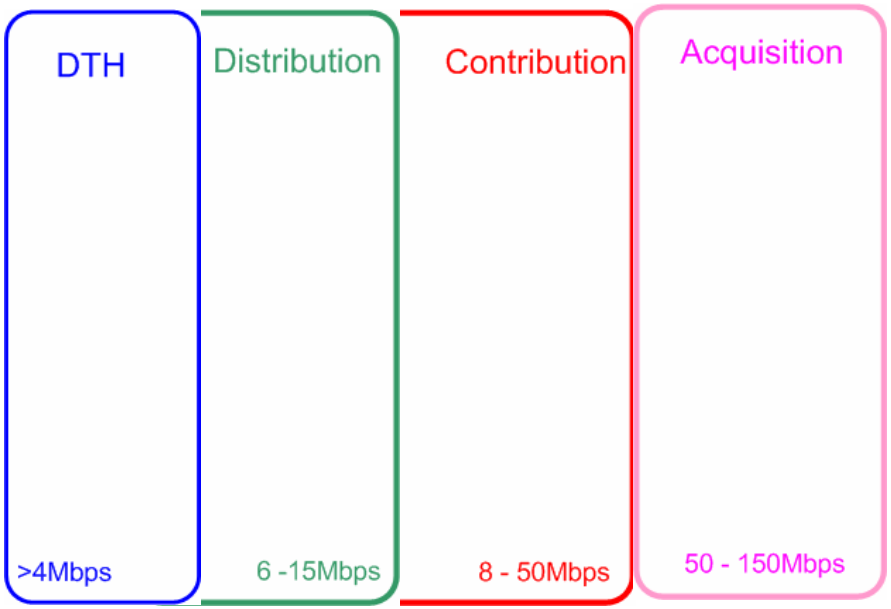
Why Consider AVC for High Definition Contribution?

Range of bit rate for Contribution: 8 - 50 Mbps



Range of bit rate for Acquisition: 50 – 150 Mbps

Distribution: 6 – 15 Mbps

DTH: >4 Mbps

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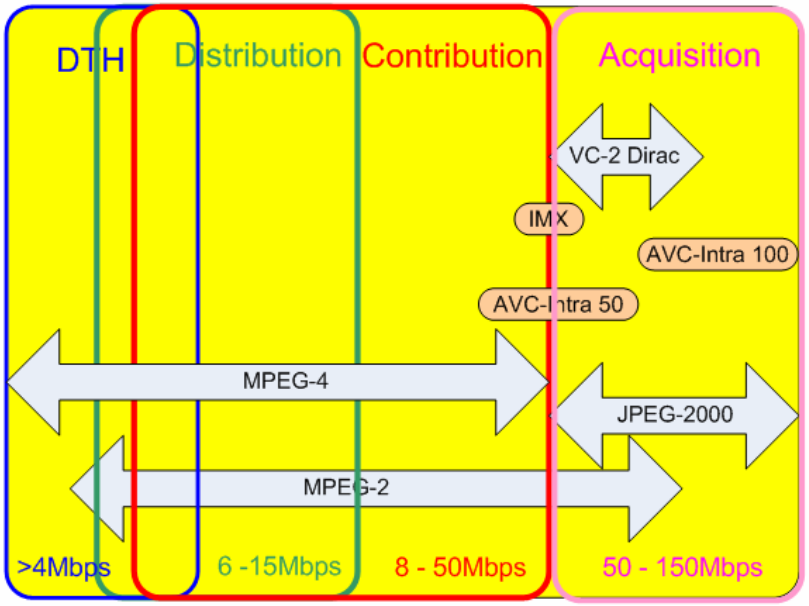
Why Consider AVC for High Definition Contribution?

Compression Market by Standard and Bit Rate



Both MPEG-4 AVC and MPEG-2 have been applied to multiple markets in the typical production chain, as shown in above chart.

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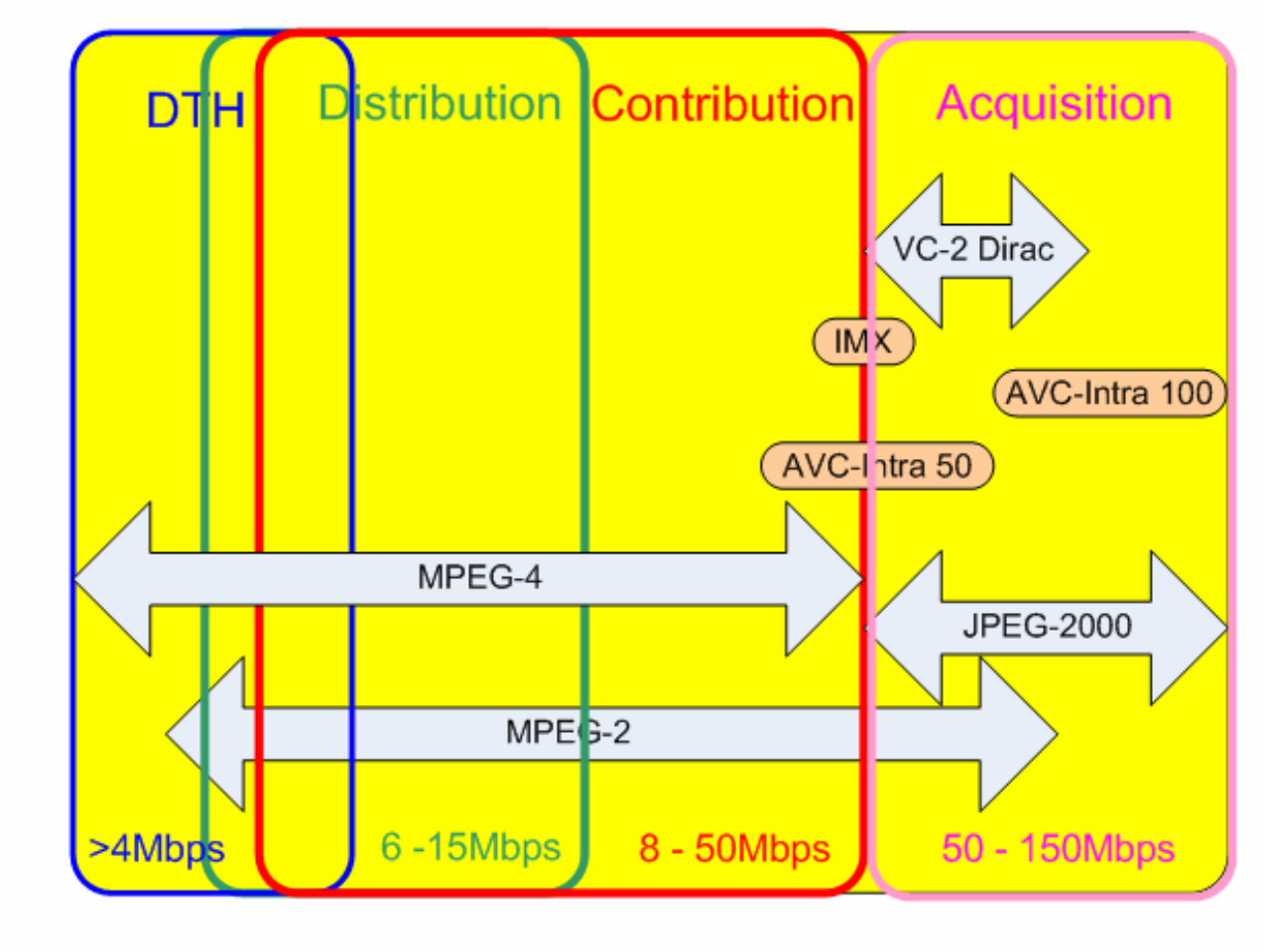
Why Consider AVC for High Definition Contribution?



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Adoption of AVC for HD Contribution Strategy

The HD contribution feature set includes:-

- Optimized performance between 8 to 50Mbps
- Low latency
- 4:2:2 Chrominance sampling for interlace content
- Handling progressive formats at higher frame rates
- 10 Bit processing for contribution quality

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Adoption of AVC for HD Contribution Strategy

Reasons for considering AVC for HD Contribution:-

- **Bandwidth**

  Enables back haul of HD over existing contribution links

- **Workflow**

  Already used in high definition production chain

- **Platform**

  Facilitates video services transition to IP

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Adoption of AVC for HD Contribution Strategy

AVC following the same path as MPEG-2 through the Fidelity Range Extensions (FRExt) :-

- High Profile (HP) 8bit / 4:2:0 sampling
- High 10 Profile (Hi10P) 10 bit / 4:2:0 sampling
- High 4:2:2 Profile (H422P) 10 bit / 4:2:2 sampling
- High 4:4:4 Profile (H444P) 10 bit / 4:4:4 sampling

plus support for lossless coding and transform error colour space conversion for RGB video.

Still subject to change

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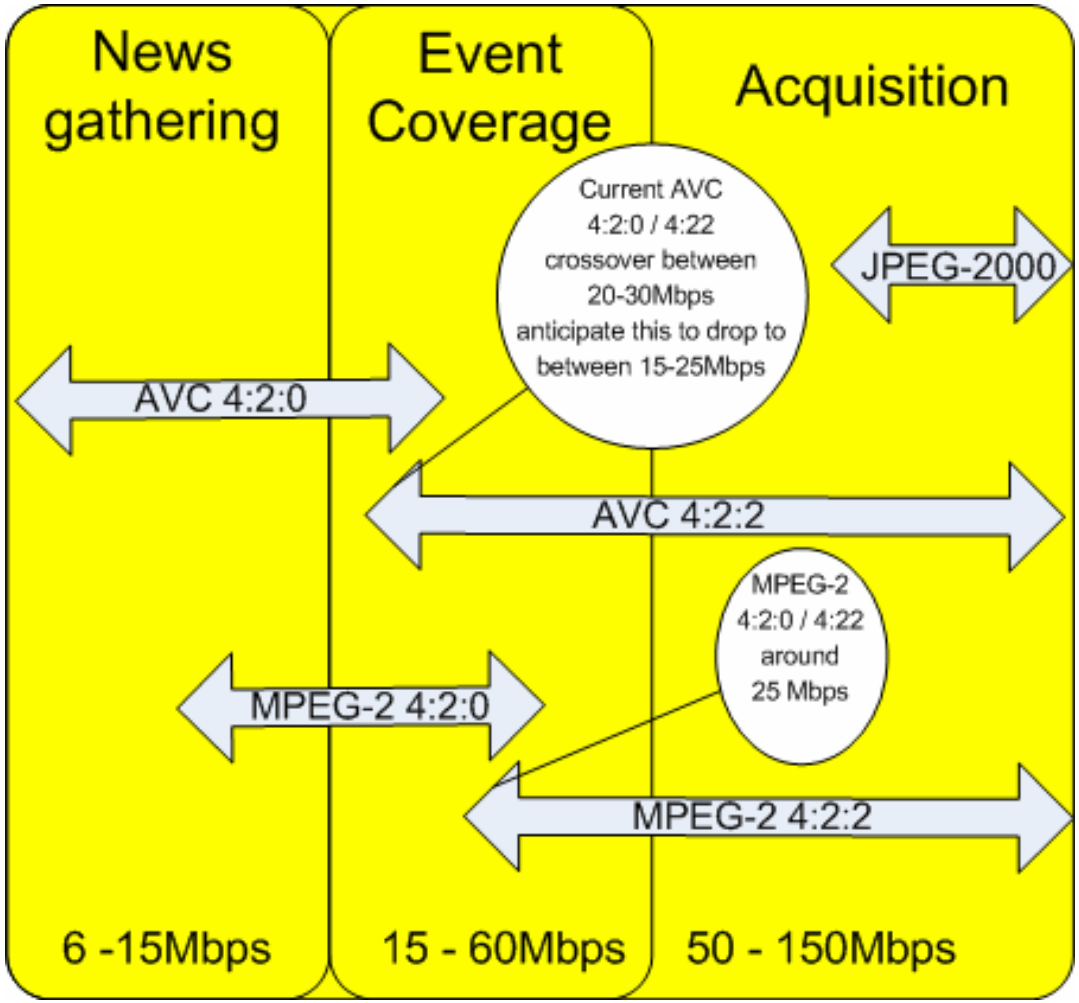
4:2:0 / 4:2:2



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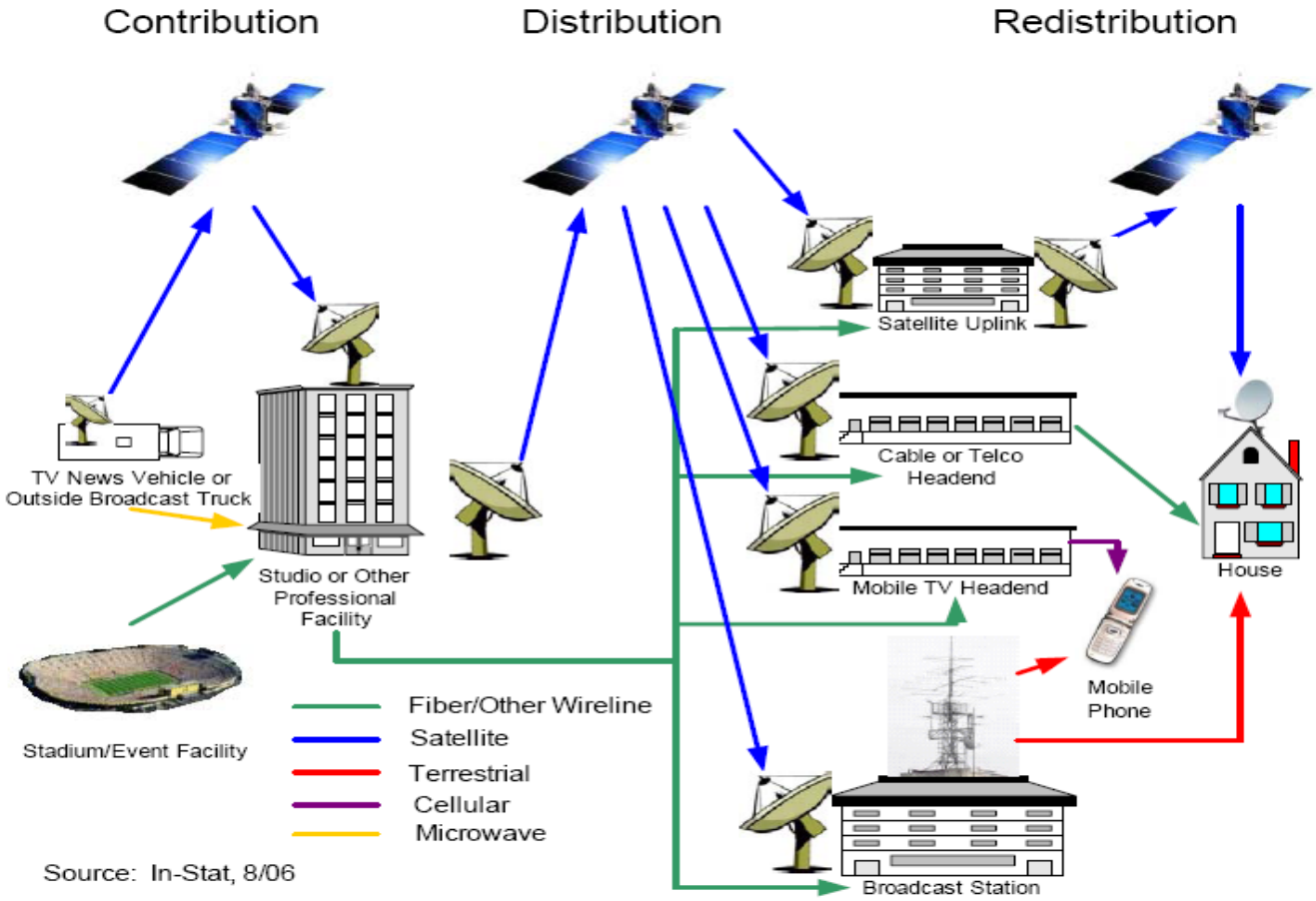
Bandwidth Available for HD Contribution



- Fixed and semi-permanent links
- High Definition News

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Bandwidth Available for HD Contribution

Fixed and semi-permanent links:-

- Trend towards higher payloads over Fibre or Satellite
- Compression strategy depends on system configuration
- Trend towards backhauling feeds rather than vision mix

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Bandwidth Available for HD Contribution

Fixed and semi-permanent links:-

- Over Satellite
  - *DVB-S2 can offer up to a 30% saving over DVB-S*
  - Using realistic S2 settings allows for approx 60Mbps
- Over Fibre
  - Greater bandwidth potential, using OC3 155Mbps
- Regardless of whether Satellite or Fibre used
  - *Need to evolve AVC & allow more feeds*
  - *Target contribution quality*
    - *6Mbps / Breaking News – 40Mbps / Olympics*

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Bandwidth Available for HD Contribution

High Definition News:-

- For both DSNG and DENG applications bandwidth scarce
  Challenge is often to offer HD over SD MPEG-2 links

- Latency frequently of prime concern
  Interviews or cuts between wired & wireless cameras

- *News is still predominantly SD*
  Awaiting the magic mix of
    Contribution Picture Quality at 6 – 15Mbps
    Latency around 300ms or lower

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Progressive or Interlaced?

In a state of transition between Progressive & Interlace :-

- Production environment moving towards 1080p 50/60
  - *Do you upgrade to an interim Interlace solution now?*
  - *Do you go for progressive, but at reduced resolution?*
  - *Or drop the frame rate?*

- Where does 1080i 4:2:2 stand in a 1080p environment?
  - *Interlace 4:2:2 equivalent to Progressive 4:2:0*

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Conclusions

- AVC offers the following benefits
  - *More efficient use of available bandwidth*
  - *Better integration with other network services*
  - *Improved workflow and multi-platform availability*
- 1080p 50/60 emerging in the production environment
  - *4:2:2 route no longer the only possible development*
- Contribution environment changing
  - *Acquisition at the high end & distribution at the low end now overlap the contribution environment*
- Reduced production steps possible
  - *Especially when the AVC standard forms the backbone of production environment*

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Thank you for listening,
any questions?

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