



MONASH University

G  **Boldly.**

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The challenge of true integration and convergence

AARNet Video Collaboration Conference
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Communications = Standards

- **We seem to be back to the roots of the US telephone system of a century ago !**

computer industry **vs** telecomms industry

US **vs** EU

proprietary lock-in **vs** open standards

commercial **vs** committee

chaos / agile **vs** regulated / slow

incompatible / fragmented **vs** *communications*



Standards *aint* standards

- **Standards-land is not all rosy though...**
- **incompatibilities between standards-
'compliant' systems**
 - multiple options, partially implemented
- **'standards-based' extensions**
- **request to industry:**
 - *please* do a better job of inter-working testing



Room-based video conferencing: **Why is it so expensive ?**

- **It used to be the encoder ('codec') hardware**
PAL 140 Mbit/s → 128 kbit/s ISDN
 - a hard ask, and major quality degradation
 - now in the HDV world, encoder built into camera, and we have more cheap bandwidth ~10Mbit/s
- **So, it's still the peripherals**
 - high quality audio system (inc. echo cancellation)
 - displays, cameras, whiteboards
 - room control system & systems integration
 - custom design & install
 - booking systems; multipoint bridge; transcoding bridge



Desktop video conferencing: **Why has it taken so long to get there ?**

- **None of this is new:**
Desktop VC ... Desktop sharing with whiteboard
... the lot !
- **Who remembers PictureTel
LiveLAN / LiveShare ? :**
- No single supplier achieved
critical mass so as to impose
monopolizing force for
'standardization' in the
desktop SOE





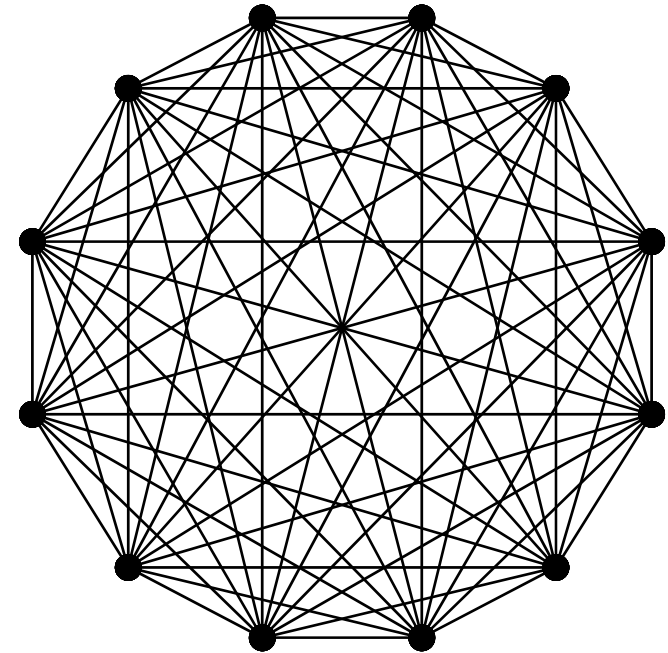
Video conferencing uptake: **Why has it taken so long ?**

- ***Many failed VC exploits over decades***
 - complexity, cost, ...
 - **Psychological dimension:**
end-users have repeatedly indicated, by voting with their feet, that they neither need nor want VC in many situations
- **VC: often a solution looking for a problem**
- **GreenIT – emerging as a new driver now:
increased awareness of TRAVEL costs
(energy & environment)
resource depletion & global heating**



Value of a communications system

- **Reach** [Metcalf's Law]
 - Value of a communications system is proportional to the square of the number of potential participants
- **Functionality**
 - It does what you want
- **Usability**
 - It's easy to use
- **Reliability & consistency**
 - It works the same every time



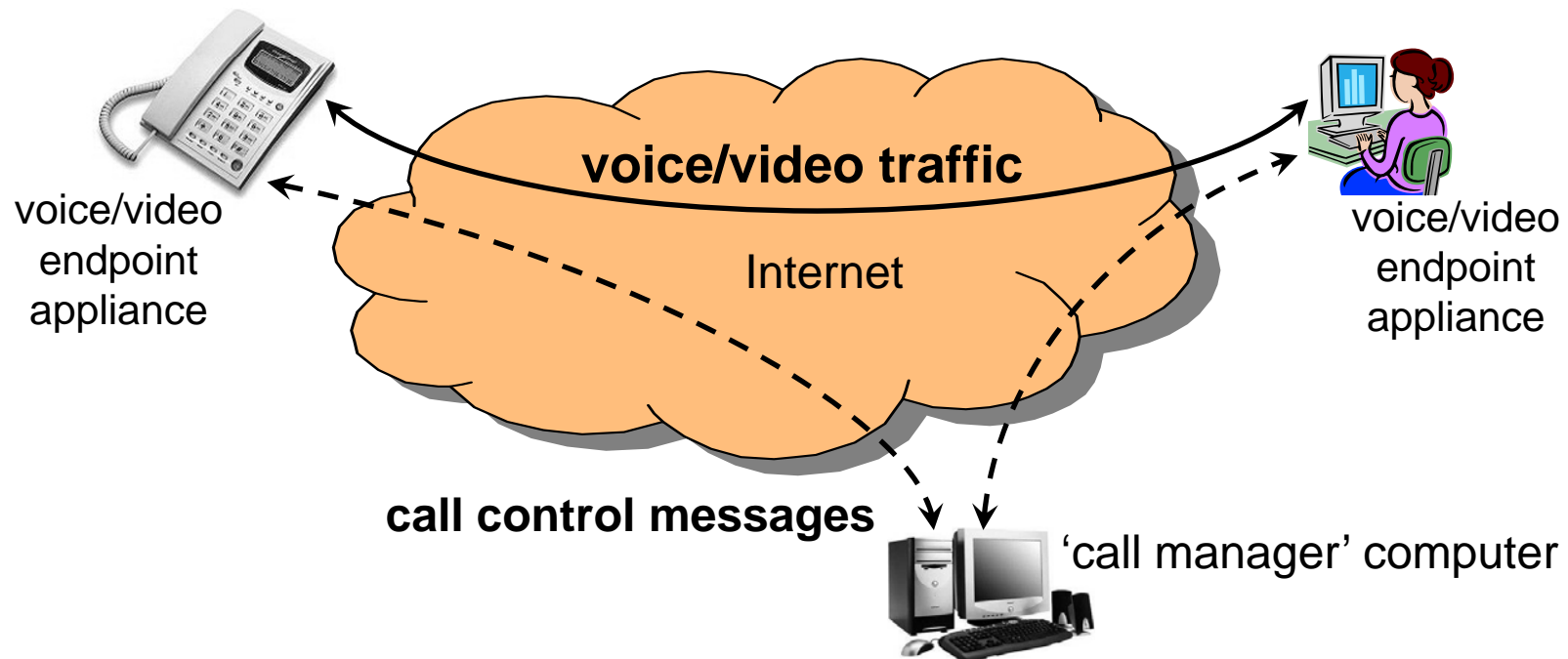


VC score sheet

- **Reach**
 - standards compliant { half marks for standards adaptor/gateway }
 - inherent multipoint { half marks for add-on multipoint }
- **Functionality**
 - audio quality
 - directory
 - ppt / app / desktop / whiteboard sharing
 - video quality
- **Usability**
 - ease of use = “it just works” = simple user interface design
- **Reliability & consistency**
 - it works { – the same – } every time



Telecomms 'in the cloud'



- voice / video traffic goes direct via the internet
- call establishment (etc.) messages go via the call control computer



What's in the box ?

VoIP should be free !

- **Or more precisely:**
Having paid for the internet, VoIP should cost ~\$0 extra
 - the voice traffic goes through the internet, not the box
- **So ... What's in the expensive box ?**
some very basic software:
 - > cf SPC PABXes which have been around since the 1980s
 - call establishment & PABX-style features
 - directoryplus:
 - multipoint conference-call bridge
 - ISDN carrier interconnect
 - > it's about time for the carriers to 'get with the programme'
 - legacy analog phone gateway (lift phones ...)
 - CTI / UC (Computer Telephony Integration / Unified Communications)



How is video different from voice-VoIP ?

... um ...

... Next question ...

- **So: Video-VoIP should be free too !**
 - Again: the video traffic goes through the internet, not the expensive box
 - > or at least, that's how it could be



How is video different from voice-VoIP ?

- **Seriously though:**
one difference is: *multipoint*
- **cf audio conferencing:**
simple multipoint paradigm: *all-to-all*
- **video conferencing: new more complex paradigm:**
New problem: *what-goes-to-who ?*
Needs some form of video mixer / 'producer'
 - multipoint as 'add-on' to point-to-point
star: centralized 'producer'/control (of video redistributed to users)
 - multipoint inherent in the user interface paradigm
mesh: distributed: user-empowered choice (of what each sees)



So: What's in the expensive video box ?

- **Again – Not much ! :**
 - **basic call control & features**
 - > access controls: who can talk to whom
 - **directory !**
 - > this has been done badly so far
 - **optional features = this is where significant cost can come in**
 - [multipoint conference bridge]
 - depending on multipoint paradigm
 - [transcoding]
 - [legacy ISDN appliance / network interconnect]
 - [live / stored convergence]
 - streaming server ; UC convergence



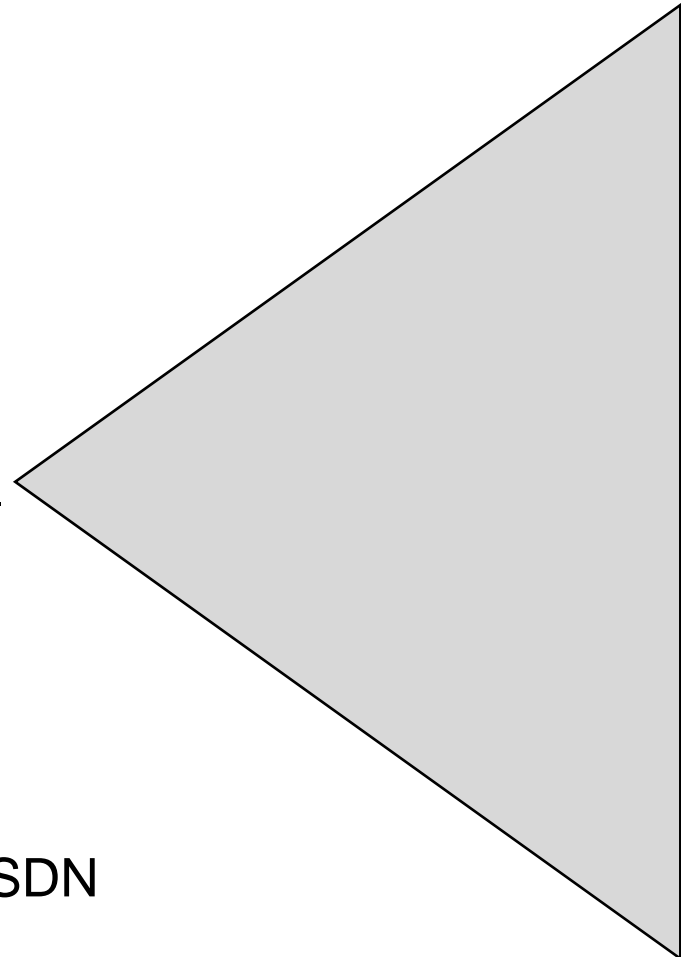
Video conferencing standards – overview

- **Umbrella standards**
 - H.323
 - > transport over IP (internet)
 - > session control
 - > many possible video codec ‘plug-ins’
 - > many possible audio codec ‘plug-ins’
 - SIP
 - > an alternative to H.323
 - H.320
 - > as above, except for transport over ISDN
 - MPEG4



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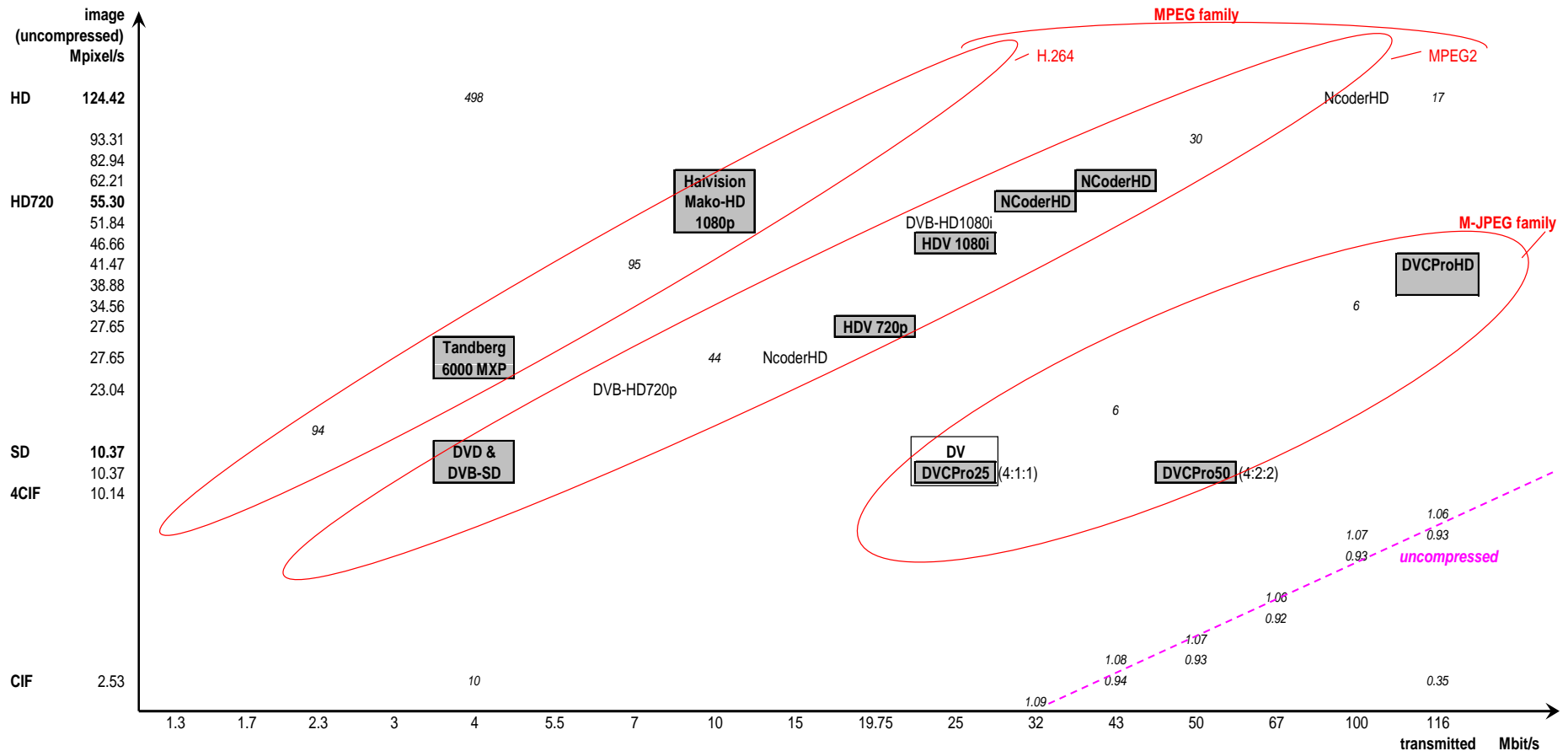


Video coding standards

- **Some important video codecs over time**
 - M-JPEG – niche applications
 - treats each frame as a separate JPEG still image
 - exploit inter-frame similarity:
 - MPEG1
 - MPEG2
 - H.261
 - H.264 = newest and best:
 - = ~2x lower bit-rate for equivalent quality
 - = ~2x higher quality for given bit-rate



Some video coding products & performance





Vendors – please...

- **Make VC equipment interoperate seamlessly**
- **Make the user interface simple and intuitive**
- **Make it reliable** (*too unreliable for too many decades*)
 - make sure it is not hit or miss every time something small changes in the environment
- **Fair & transparent pricing please (carriers too !)**
 - don't package simple software as expensive hardware
 - no per seat licensing
 - don't think that you can get as much money as a PABX otherwise Skype will get you in the end!



Integrators – when building a solution...

- **Keep it simple for the users**
 - something simple that works reliably is better than something fancy that is unreliable
- **Don't just accept what vendors dish out...**
 - pressure them to build you robust interoperable solutions to deploy



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Questions ?