

DVTS Overview

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Internet2

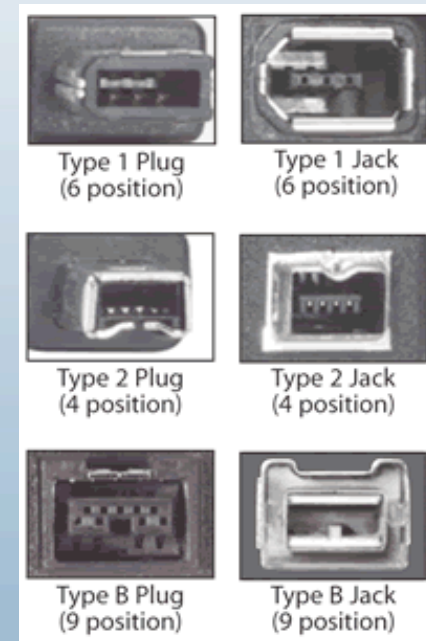


Using a consumer DV Cam for high quality video on the Internet

- ***you can send & receive High Quality A/V***
 - *that doesn't require funny, expensive machines (MPEG2)*
 - *that doesn't involve intellectual property issues (royalties)*
 - *that doesn't require unusual, expensive cameras (HDTV)*
 - *that does require a network capable of doing 30 mbps*
- ***all you need is a capable Network and ...***
 - *a DV capable camera (HandyCam, DVCAM, DVCPPro) with IEEE1394 (**firewire**) capability*
 - *DV receiver (deck, camera, TV) that is firewire capable*
 - *Or an analog/digital converter(s) if using a non-firewire capable camera/receiver (Canopus ADVC 100)*
 - *a computer with IEEE1394 (**firewire**) capability*

What is IEEE 1394 (firewire) and why should I care?

- Connects the camera to the computer
- Provides high quality digital path
- “Firewire” developed by Apple Computer
 - It is really a high-speed serial data bus
 - IEEE 1394 is the published specification for high-speed serial bus
- **Firewire 400**
 - 400 Mbit/s over a distance of 4.5M
 - Double twisted pair, 28 AWG wire
 - Longer distance possible using higher gauges and slower data rates
- **Firewire 800**
 - 800 Mbit/s over a distance of 100M



What is DV (Digital Video)?

- **Digital Video**, put simply, is video that has been digitally sampled
- **Digital Video** comes in many formats and data rates. Examples:
 - CCIR 601/SDI @ 270-360 Mbps @ 4:2:2 (ITU-R BT.601)
 - Digital composite @ 95-135mbps
 - MPEG2 4:2:2 @ up to 100Mbps
 - High Definition – SMPTE 292M, ATSC rates, and MPEG2MP@HL 13-100Mbps
 - Streaming Video: Real, WM, Quicktime/Darwin/Sorensen, etc.

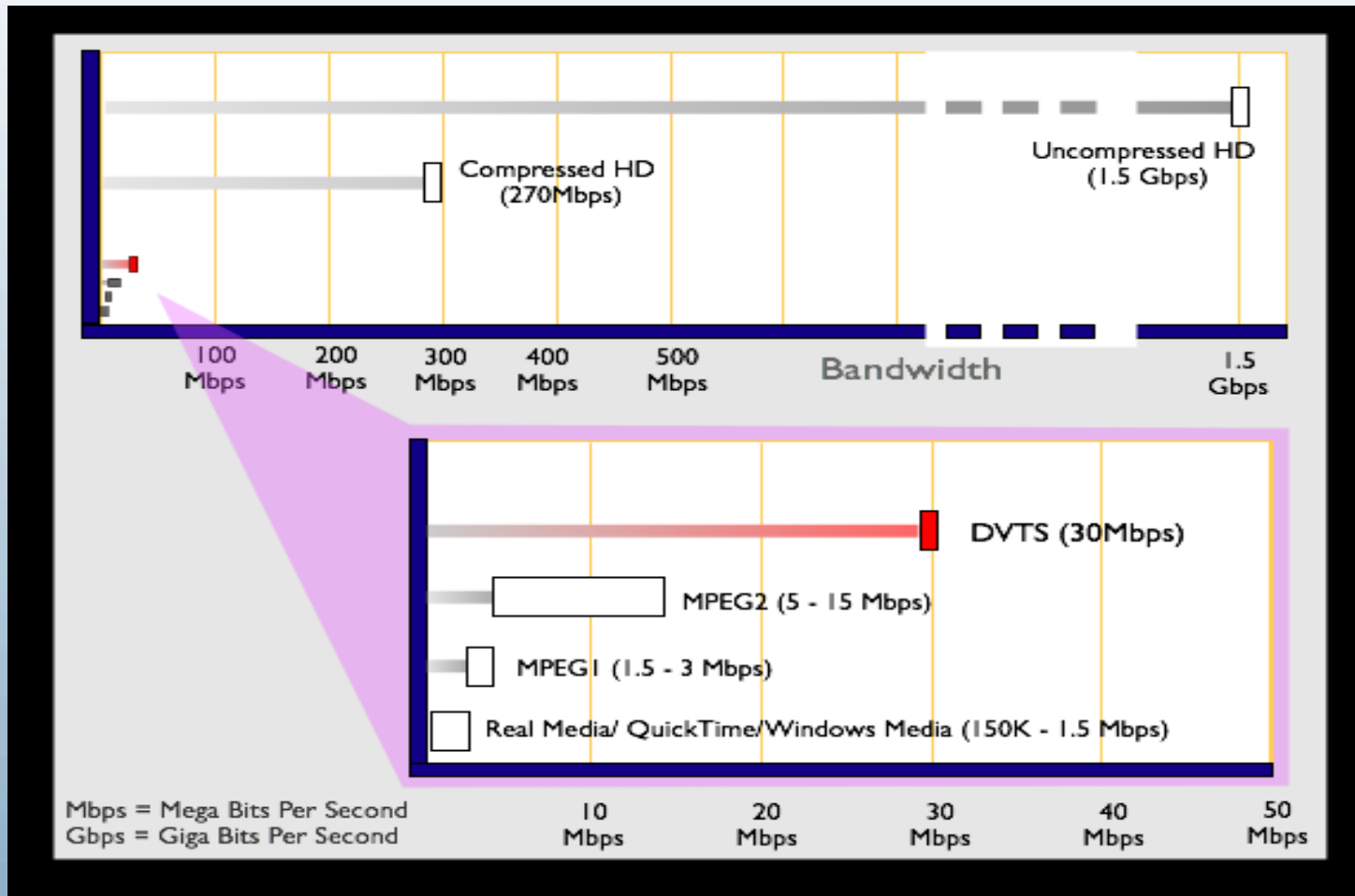
The Digital Camcorder uses DV25

- **DV25** is a common form of digital video reduction and compression employed in consumer digital camcorders
- **DV25** applies a 5:1 compression and a 4:1:1 color space; achieves a fixed data rate of **25 mbps**
- Audio is typically two-channel PCM encoded at 12 or 16 bits, sampled at 48kHz, similar to CD or DAT
- **DV25** achieves relatively high audio and picture quality with very **low encoding latency**.
- End-to-end quality is fully preserved: No additional compression/decompression is added

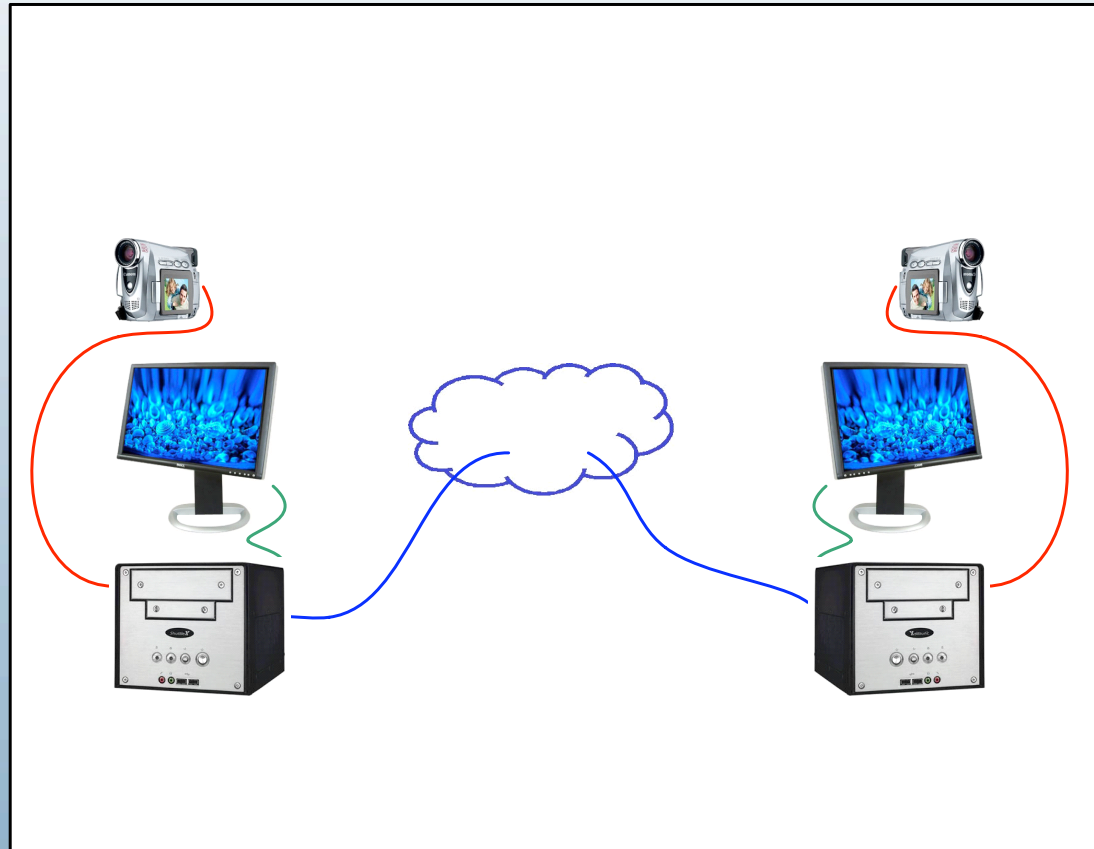
Where does DV25 “fit” using bandwidth when you put it on the Internet?

- **Real/Quicktime/WM/Flash:** 50 kBit/s-1 Mbit/s per stream
- **MPEG1:** 1.5 - 3 Mbit/s per stream
- **MPEG2:** 4 - 15 Mbit/s per stream
- **DV25 (DVTS):** 30 Mbit/s per stream
 - 25 Mbit/s for video, 5 Mbit/s for audio and overhead
- **Compressed HDTV:** 20 Mbit/s – 1 Gbit/s per stream
- **Uncompressed HDTV:** 1.5 Gbit/s per stream

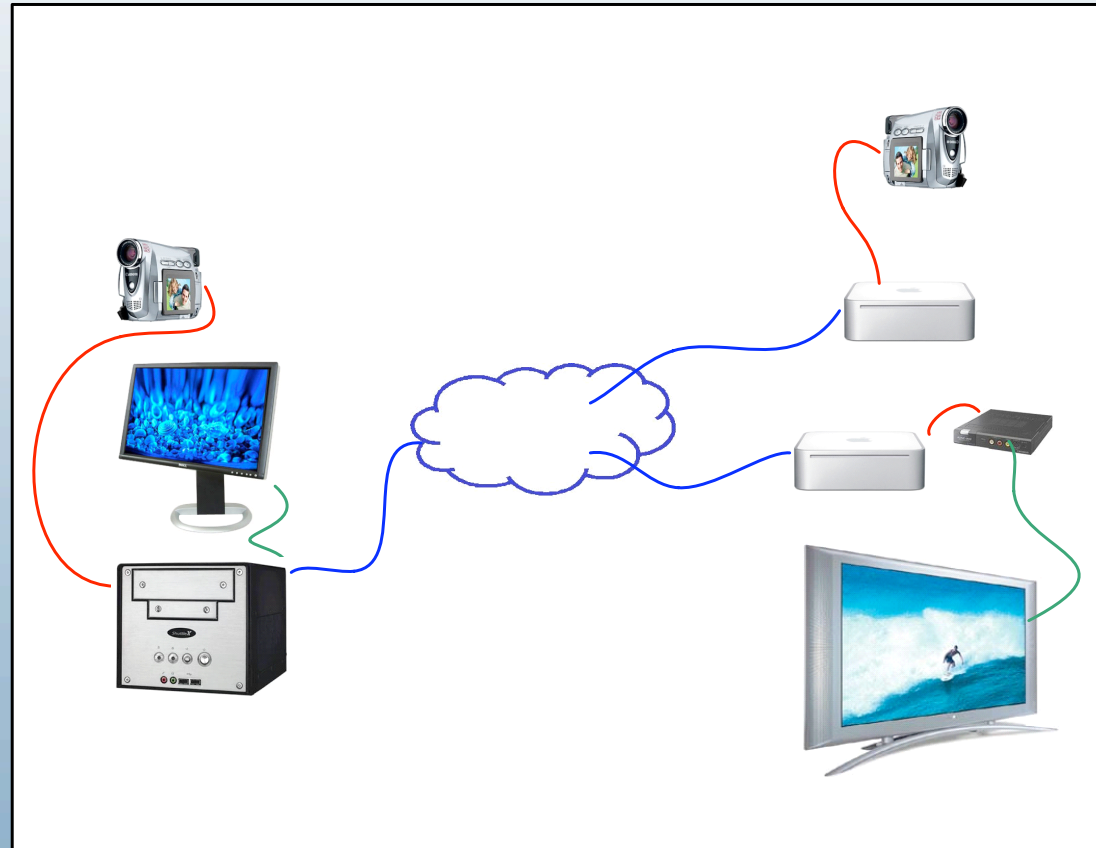
Graphical Bandwidth Comparison



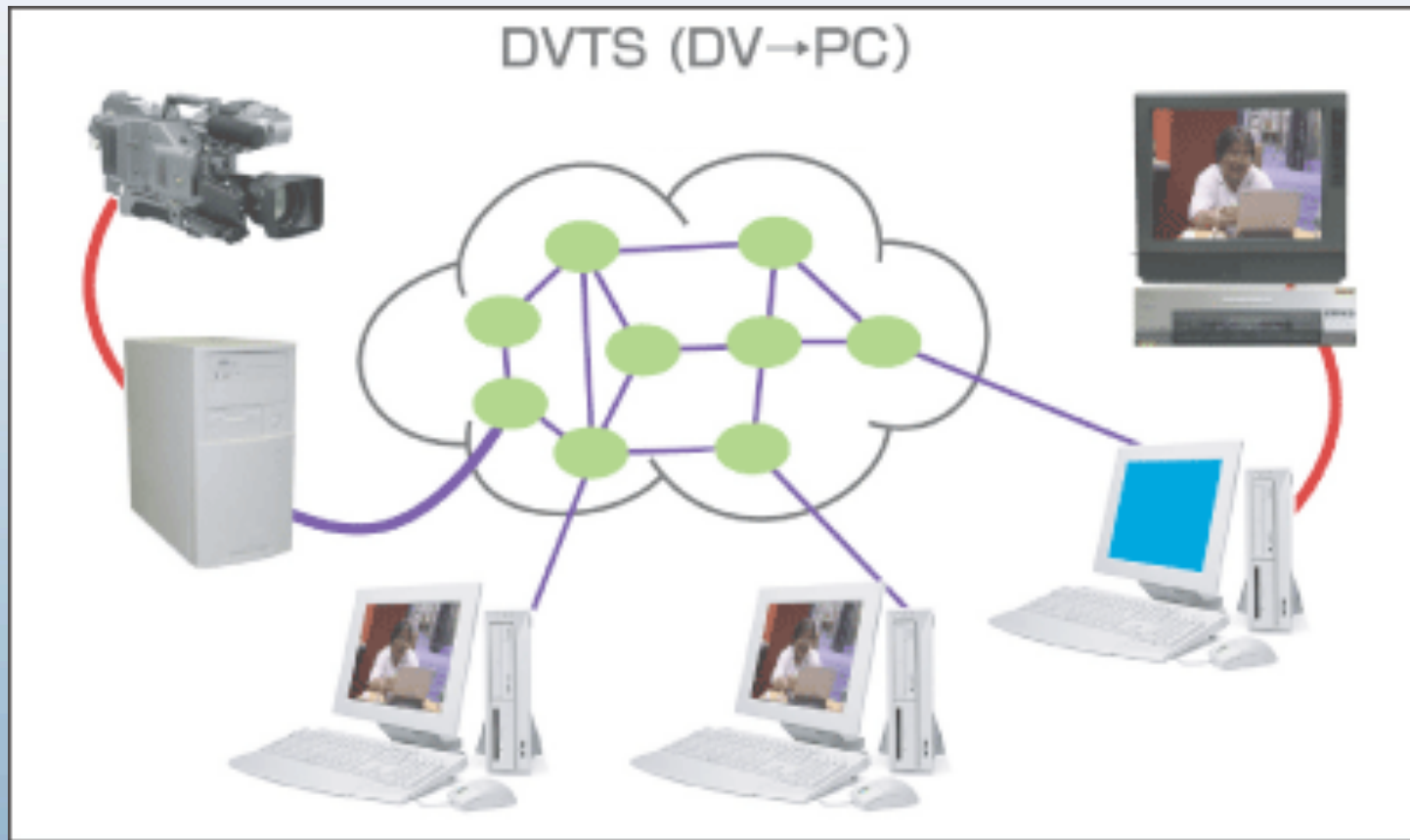
DVTS unicast point to point:



DVTS unicast point to point:



DVTS Multicast Example:



Things you can do with DVTS

- **2009 Spring Member Meeting**
 - View High Quality Netcasts
- **Video “Conference”**
 - Both P2P and multipoint (using multicast)
 - Master Class – music instruction
 - Access Grid integration (*APAN work*)
- **Internet2 “DV Guide”**
- **Remote Production Recording**

What is the “DVGuide”?

Imagine that ...

- you could tune your computer into a series of “***educational***” channels the same way you tune your television into satellite channels
- you could send & receive DV quality video across the internet with the same ease as sending & receiving ***email***
- you could expand the borders of the campus, reaching alumni, colleagues, students, and potential students through an institutional television channel
- you could do all this without any significant capital expenditure by taking advantage of resources that currently exist on your campus

Introducing the “DVGuide”!

INTERNET² DV GUIDE JAN 05 2007 View Listings View Articles Search Radio

USF UNIVERSITY OF SOUTH FLORIDA College of Visual & Performing Arts



Nov 1 2004 View Listings

Search Edit



CHANNEL	ResearchChannel www.researchchannel.org DVTS-233.45.17.50/8000 VLC-233.22.21.20/1234	USF CVPA Multicast Channel University of South Florida DVTS-233.22.29.128/8000	Internet2 DVTS test Channel ResearchChannel Working Group DVTS-233.45.17.50/8000 VLC-233.45.17.247/4444	Special Events Channel 1
MIDN	CORNEAL TRANSPLANT SURGERY close up look at eye surgery	Thank You, Eddie Hart Midnite - 2am	Late Night Jazz blank	
12:30				
1:00	The Healthy-U Sport Psychology: Keys to Peak Performance			
1:30				
2:00	From the National Institutes of Health: Research on Health Disparities Sickle Cell Disease - Recent Advances	A Movie about Movies 2am - 4am		
2:30				
3:00	Cosmetic and Ophthalmic Surgery Refractive Surgery: Patient Information			
3:30	14			

<http://db.arts.usf.edu/dvguide>

**brought to you
by ...**



Internet2/ResearchChannel®
Working Group

Internet2/ResearchChannel/Bigvideo Working Group

- The Internet2/ResearchChannel Working Group provides a testbed for the exploration of high-quality demand and streaming video applications across Internet2 backbones and associated campus networks.
- Bigvideo has been a subcommittee of the Internet2-ResearchChannel Working Group interested in using affordable and widely available cameras, PC's, software, and hardware began testing DV as an option between typical streaming products and the atypical High Definition Television capabilities.

USF CVPA (courtesy of Michael Koberstein)

A word about Echo cancellation

- When do you need it?
 - Interactive (two way) sessions
- How can I avoid it?
 - Headset, position of microphones & speakers
 - Brian's audio talk – dynamic, ribbon, condenser mics
- Should I avoid it?
 - Brian Shepard might argue for thinking about this carefully with regard to latency/complexity
 - Echo rejection versus echo cancellation
 - Electronic devices: Voice versus music

A quick word about lighting/audio

- Match investment to the event
 - Personal video conference
 - Master's class
 - Demo for “funding sources”
 - Nationally “broadcast” stream
 - Etc.
- Do not underestimate need for good lighting

How do I get started?

- ***DVTS – software***

- *Software encapsulation using the PC processor, NIC, etc.*
- *Requires a firewire card to “send” (and for “firewire” receive)*
- *Runs on number of platforms, though Windows has the best GUI (OS X, Linux KNOPPIX dvts_pl from IU)*
- *Windows, and Linux can use PC monitor for display*

DVTS Software Platforms

Hardware	Operating System	IEEE 1394/Firewire	Multiple firewire port support
Macintosh Power PC	OSX	Port built-in	no
Macintosh Intel	OSX	Port built-in	no
Pentium III or greater	Windows XP	PC firewire card or built in	yes
Pentium III or greater	Linux	PC firewire card or built in	no

DVTS Software versions

Operating System	Command line applications				GUI application			
	dvsend	dvrecv	dvsave	dvplay	App Name	Firewire Send	Firewire Receive	Render to screen
Mac OSX	yes	yes	yes	yes	dvts.app*	yes	yes	no
Windows XP/Vista	no	no	no	no	dvts.exe	yes	yes	yes
LINUX	yes	yes	yes	yes	-	-	-	-

* This application is alpha release level

Further information

- Resources
 - <http://apps.internet2.edu/dvts>
 - WIDE Project - <http://www.sfc.wide.ad.jp/DVTS/>
- Internet2 Contacts
 - Ann Doyle - adoyle@internet2.edu
 - Ben Fineman – bfineman@internet2.edu
- Merit Contacts
 - Laurie Kirchmeier - laurie@merit.edu
- New World Symphony Contacts
 - Justin Trieger – justin.trieger@nws.edu

Questions?

