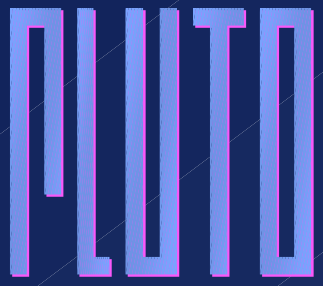

Technologies International Inc.

Mark Gray

Television

What is ATV?

What is DTV?

What is HDTV?

What is SDTV?

How Mass is Mass Storage?

ATV=Advanced Television

- 1987: U.S. not factor re: Advanced TV - Advanced Television Systems Committee appointed - then Grand Alliance
- 1996: FCC's DTV transmission standard adopted -based on Grand Alliance digital system
- 1997: DTV service rules, second broadcast channel, and deployment schedule established

Digital Television

- 27 Broadcasters on air by 11/1/98, plus networks to feed them
- Network affiliates in top ten markets: by 5/1/99
- Affiliates in markets 11-30: by 11/1/99
- All other commercial stations have 5 years (from 4/97)
- All non-commercial stations have 6 years

Scanning Formats

- NTSC: 525 scanning lines
- Grand Alliance: Incorporates both interlaced (as TV today) and progressive (as in computers) scanning
- Ultimate goal: 1000+ lines progressively scanned (Electronic 35mm film)
  - facilitates interoperability and HDTV
  - Not feasible today, but soon?

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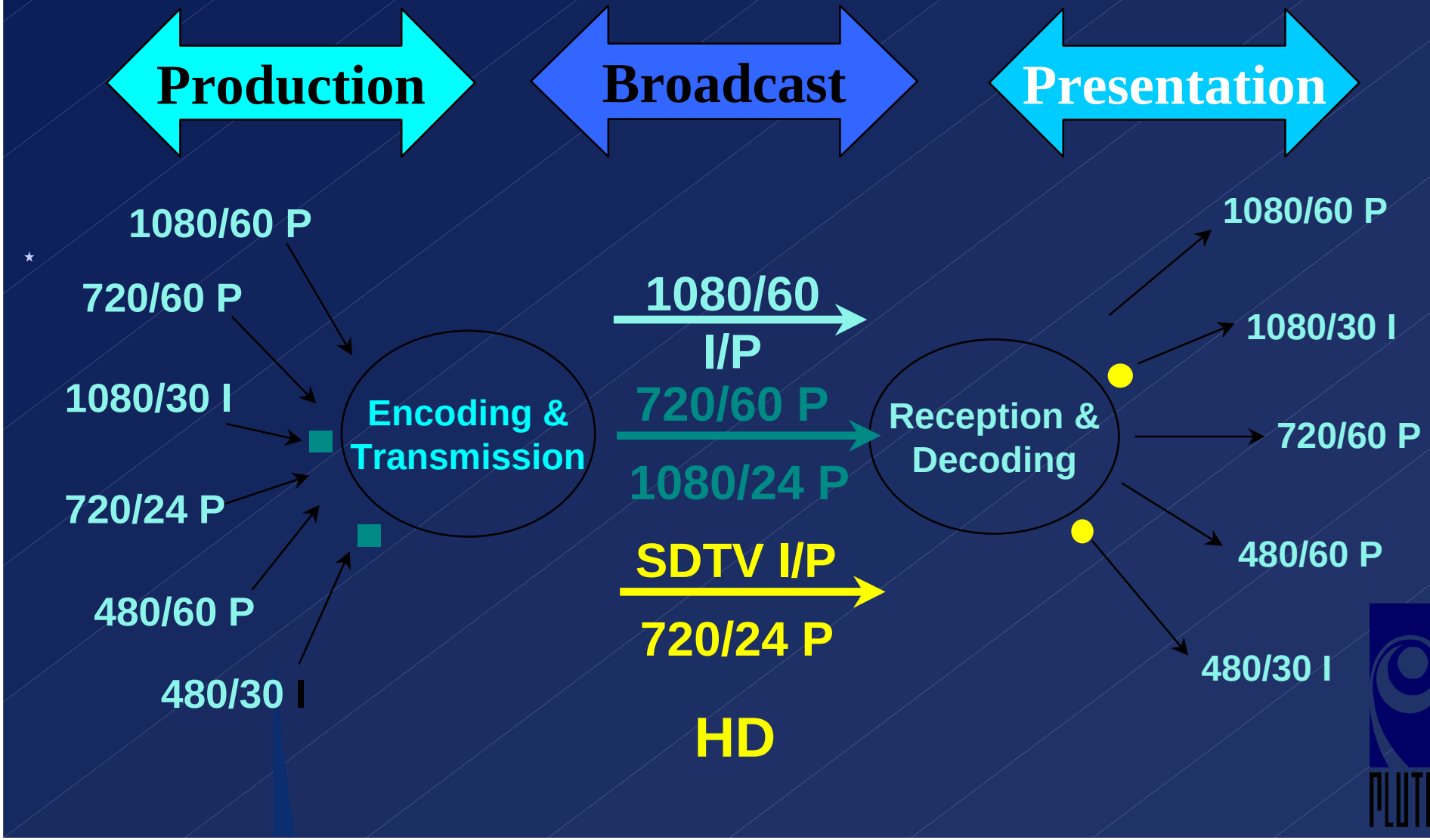
How High is Definition

A Techno-Religious Argument

- High Defintion (HDTV)
  - 1,080 scanning lines and 1,920 pixels per line, interlaced = 1.5Gb/s (CBS)
  - 720 lines by 1920 pixels progressively scanned = 1.5Gb/s (ABC)
  - 480 lines by 720 pixels progressive = 360Mb/s (Fox)
- Standard Definition (SDTV)
  - 480 lines by 960 pixels interlaced = 270Mb/s

60Hz DTV Formats



Television is Not Just Television Anymore

- Grand Alliance framework can deliver
  - •HDTV, Multiple SDTV, data, on-line services, and subscription TV
  - •Can shift dynamically between these
  - •so, not either/or choice
- Some broadcasters favor HDTV, at least for prime time (35mm film programming)
- Others favor SDTV/Pay plus multiple channels - thus confusion

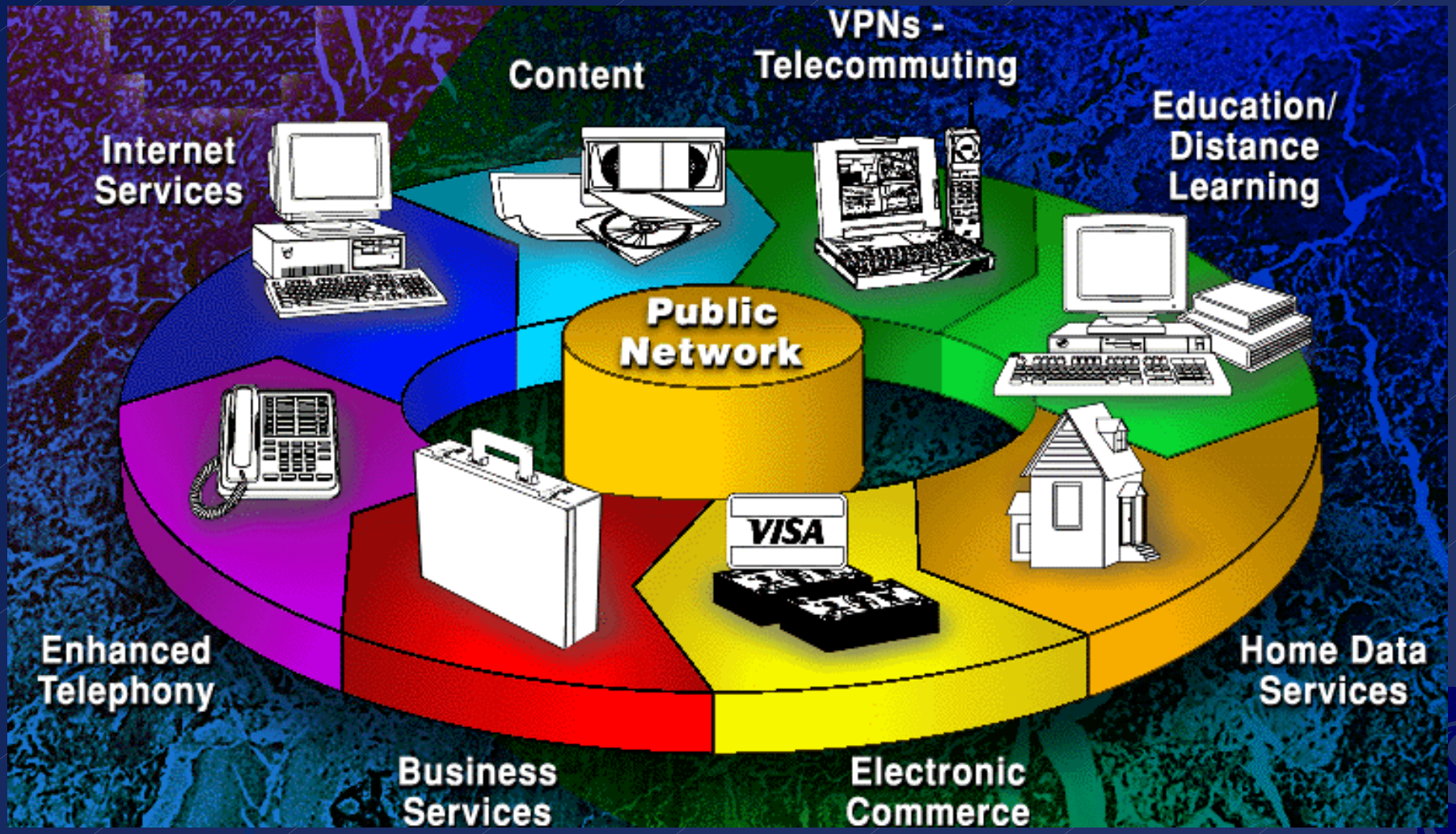
New Broadcast Services

- Enhanced TV
  - High picture quality
  - Parallel programming
  - Links to cached information
  - Personal data streams e.g. tickers
- Data broadcasting
  - General interest - magazines
  - Targeted - personalized web pages
  - Software - games, education, productivity
- Guides
  - Program Guides
  - Web guides
  - Community guides
  - Yellow Pages
- Merchandizing
  - Cached video ads
  - Coupons
- Browser enhancements
  - Premium web content
  - Links to video

Multi-Mode Broadcasting

New Network Businesses

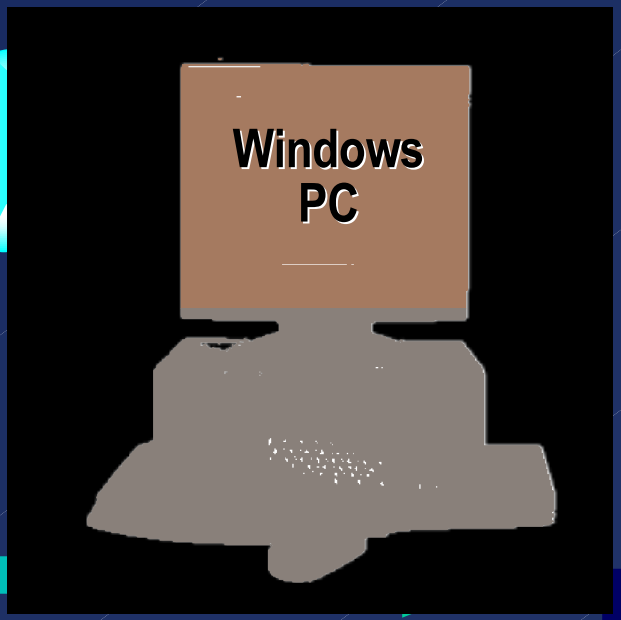
Each Requiring Mass Storage



Industries At Crossroads

Video, simplicity

?



Computing, Web

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The Next Mass Media

Printing press

Radio

Television

Online TV & PC

Better PCs, Better TVs

Digital Television content

Enhanced TV shows

Broadcast TV content

Digital Television content

DVD content

Broadcast Web content

Enhanced TV shows

Progressive scan displays

Game content

DVD content

Broadcast Web content

Personal computer

Television

Difference: processing power, options.
Display will be chosen based on use.

Cross-Industry Effort Required

Broadcast Industry

- Content
- Programming
- Distribution
  (Terrestrial, Satellite, Cable)

Consumer Electronics Industry

- Receivers
- Displays

DTV

PC Industry

- PC OEMs
- PC Software Developers
- PC Hardware Developers

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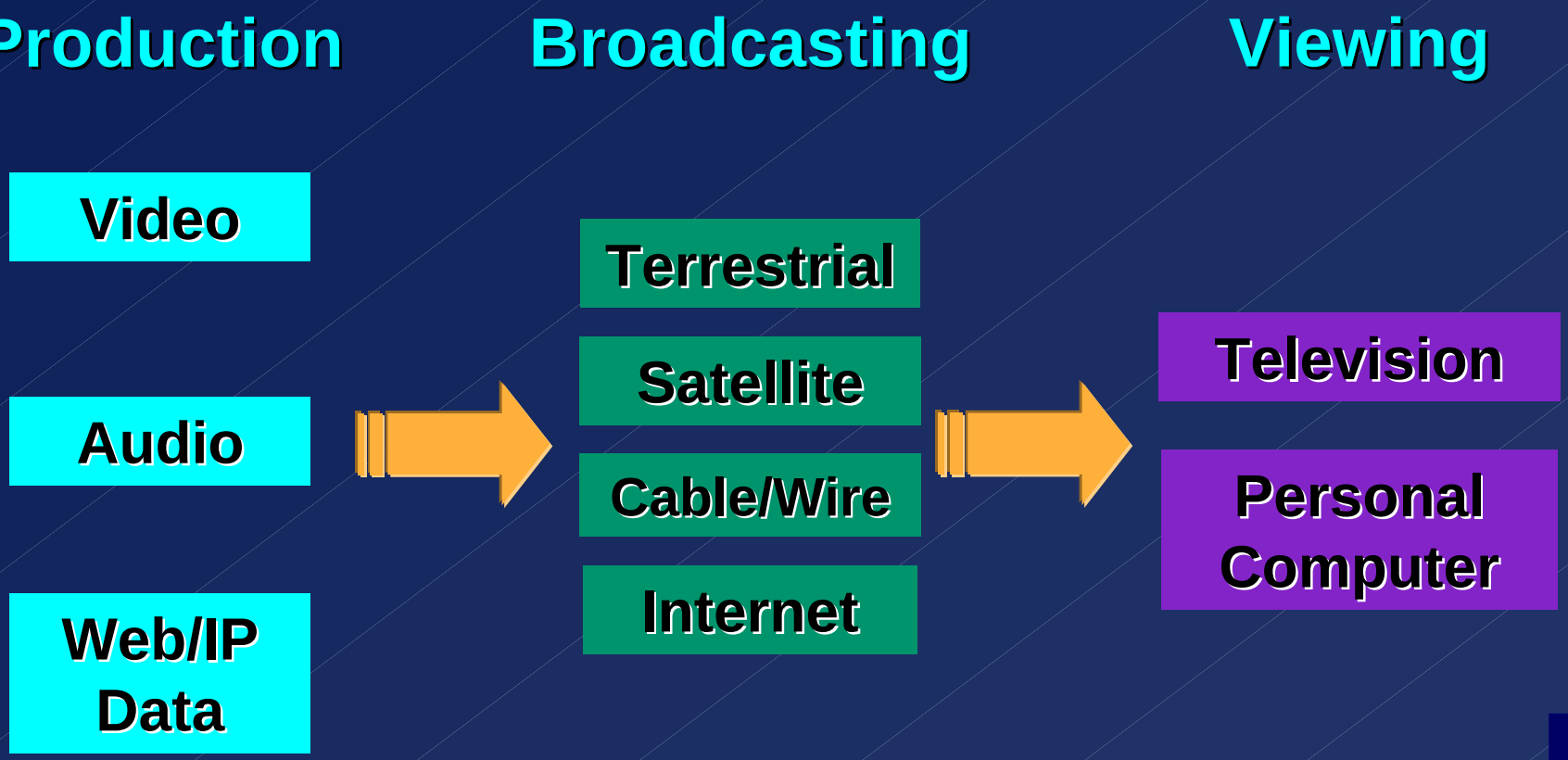
Digital Broadcasting Infrastructure



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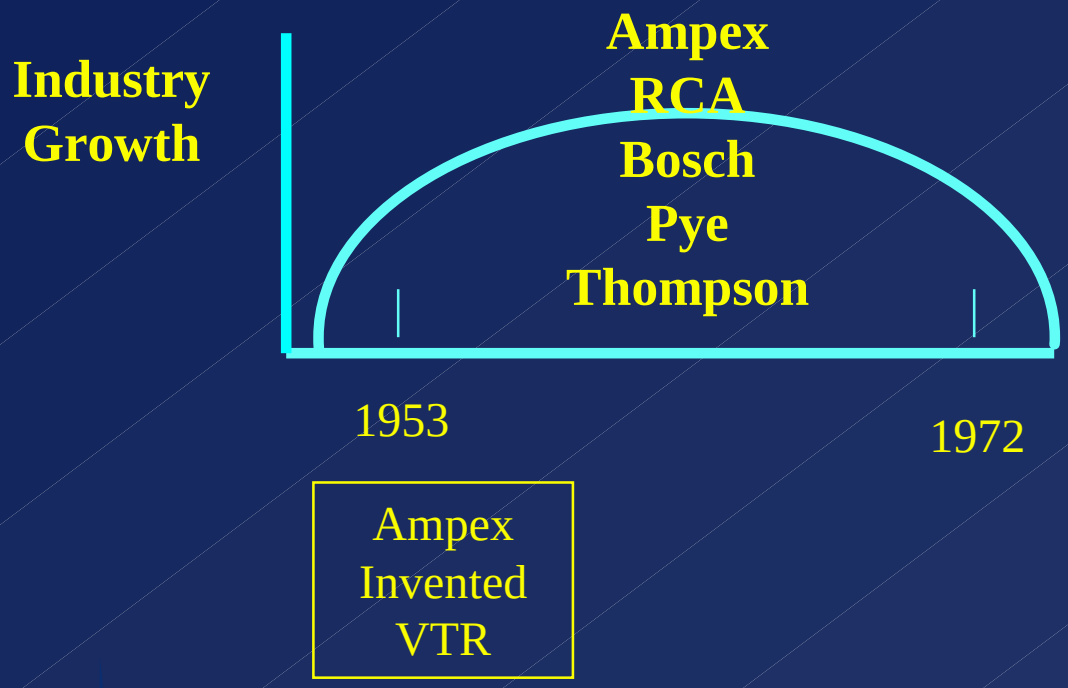
The driving core of the professional video and broadcast industry has been, is and will continue to be the *storage* of the media

Waves of Technology in Storage Lead Industry Growth

Industry Giants



Waves of Technology in Storage
Advent of New Players

Industry Giants

Bridge Points

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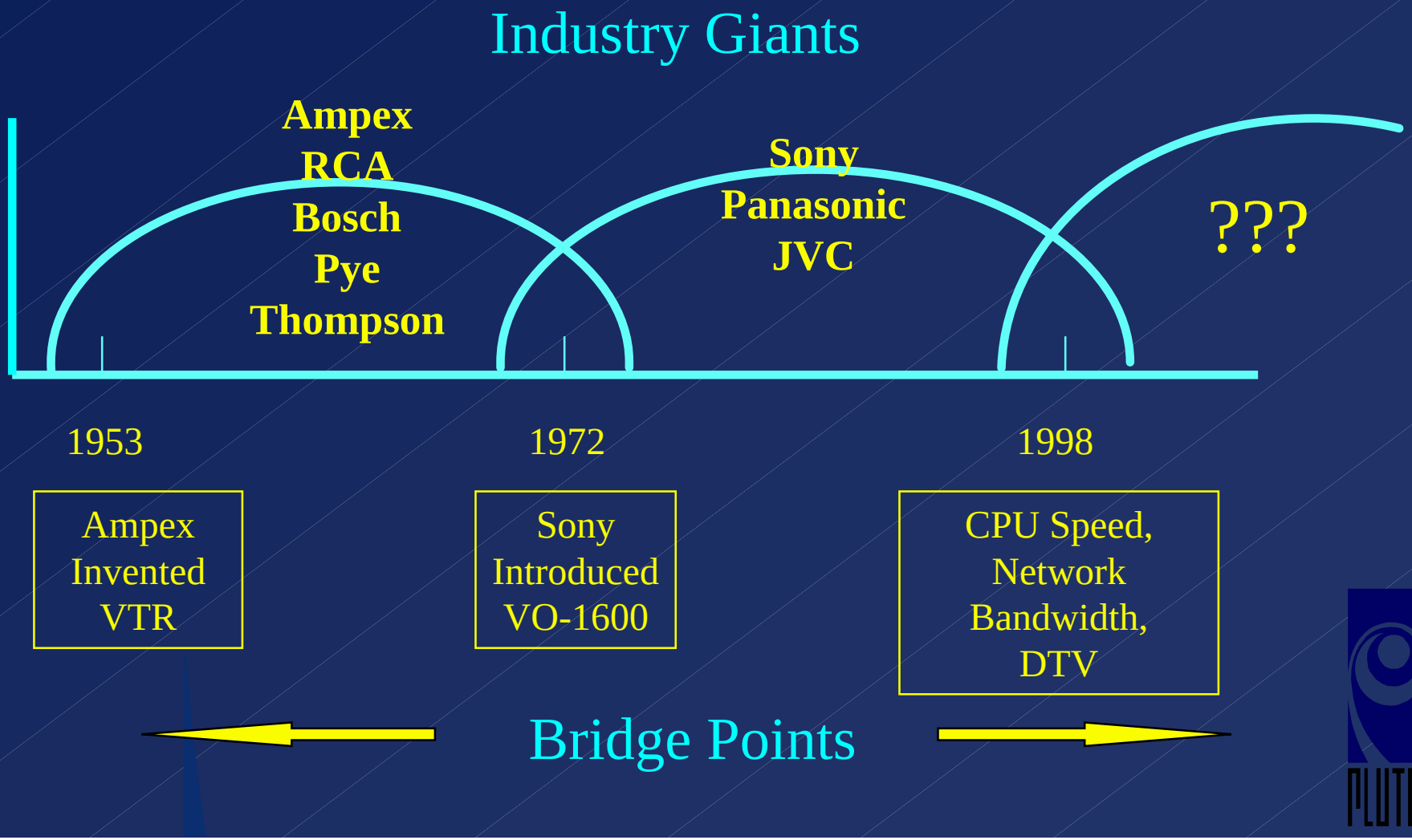
At the Threshhold of the Next Major Technology Shift



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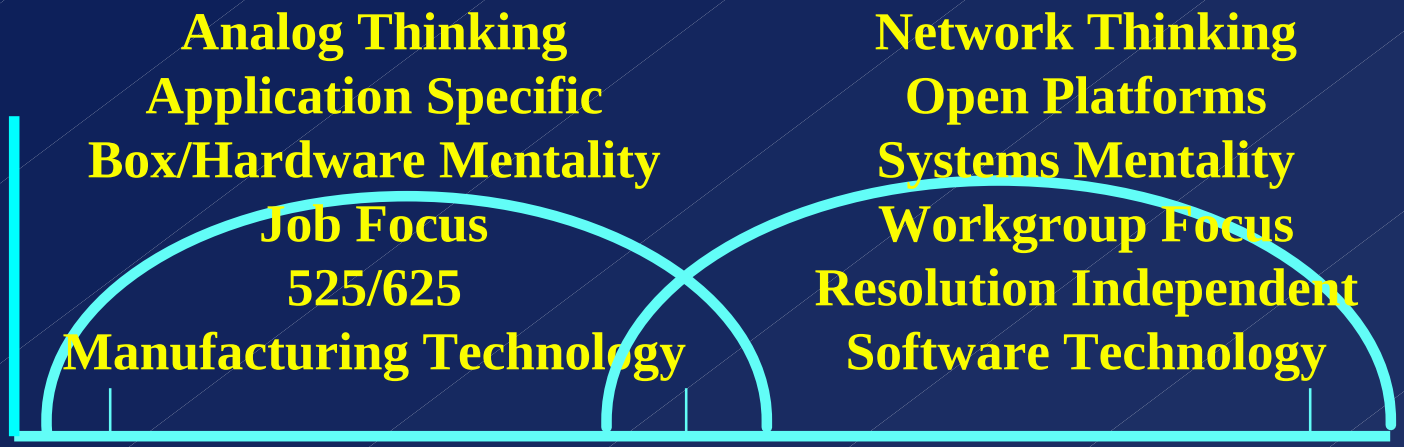
Waves of Technology Change in Storaging and Distributing Video Signals



Data Protection
Highly Desireable

Data Protection
Mandatory

Manufacturers
Dilemma =
Buyer's Dilemma

Market Situation

“Classical Analog” Environment

- Video Tape Recorders
- Production Switchers
- Telecine machines
- Special Effects boxes
- Audio / Editing consoles
- Character Generators
- Colorizers and formatters

Market Situation

"Classical Analog" Environment

- Video Tape Recorders
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- Audio consoles
- Colorizers and formatters

Emerging "Digital Video"

- Desktop workstations
- Software based editing, special effects, paint, character generation, audio control, etc.
- Computer animation
- Interactive/Internet
- Local and Wide Area Networks

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Market Situation

“Classical” Environment

- Video Tape Rec
- Production S
- Telecine M
- Special Effec
- Editing console
- Audio consoles
- Colorizers and formatters

Hybrid Design
Multiple Formats
Storage
Networking
File Interchange

Emerging “Digital Video”

- rive recorders
- orkstations
- sed editing,
- effects, paint, and
- control
- puter animation
- Interactive/Internet

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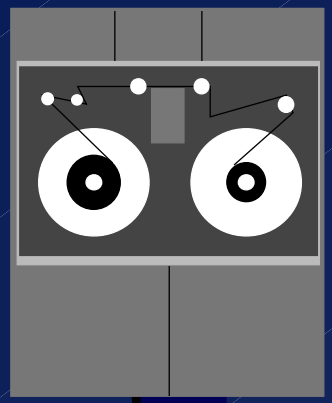
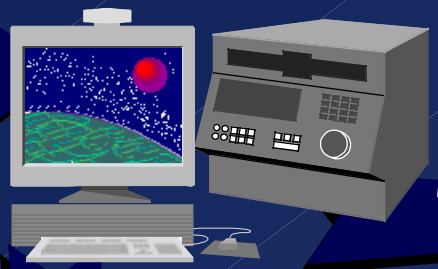
Television World Today



Telecine

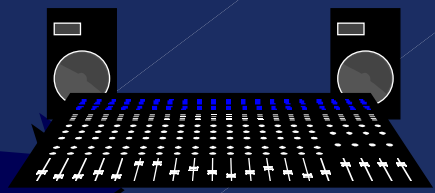
VTR

VTR



Graphics

Audio Sweetening



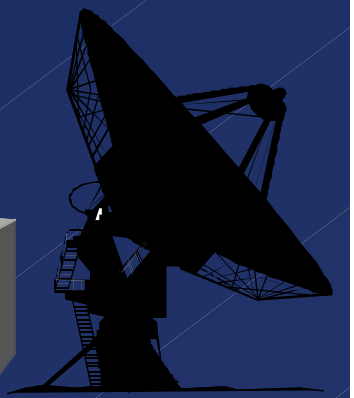
Off Line

VTR

VTR

Online Editing

VTR



Distribution

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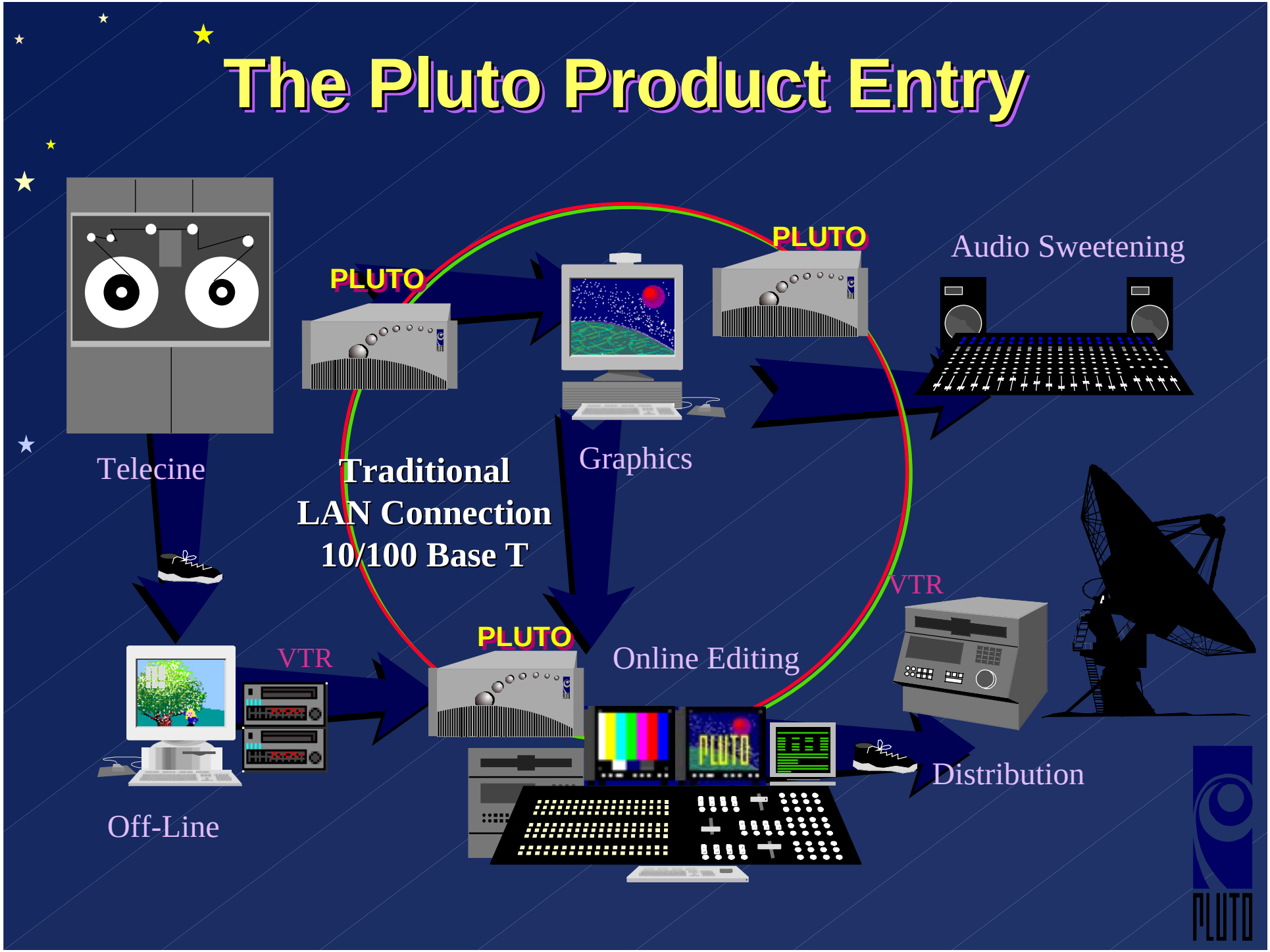
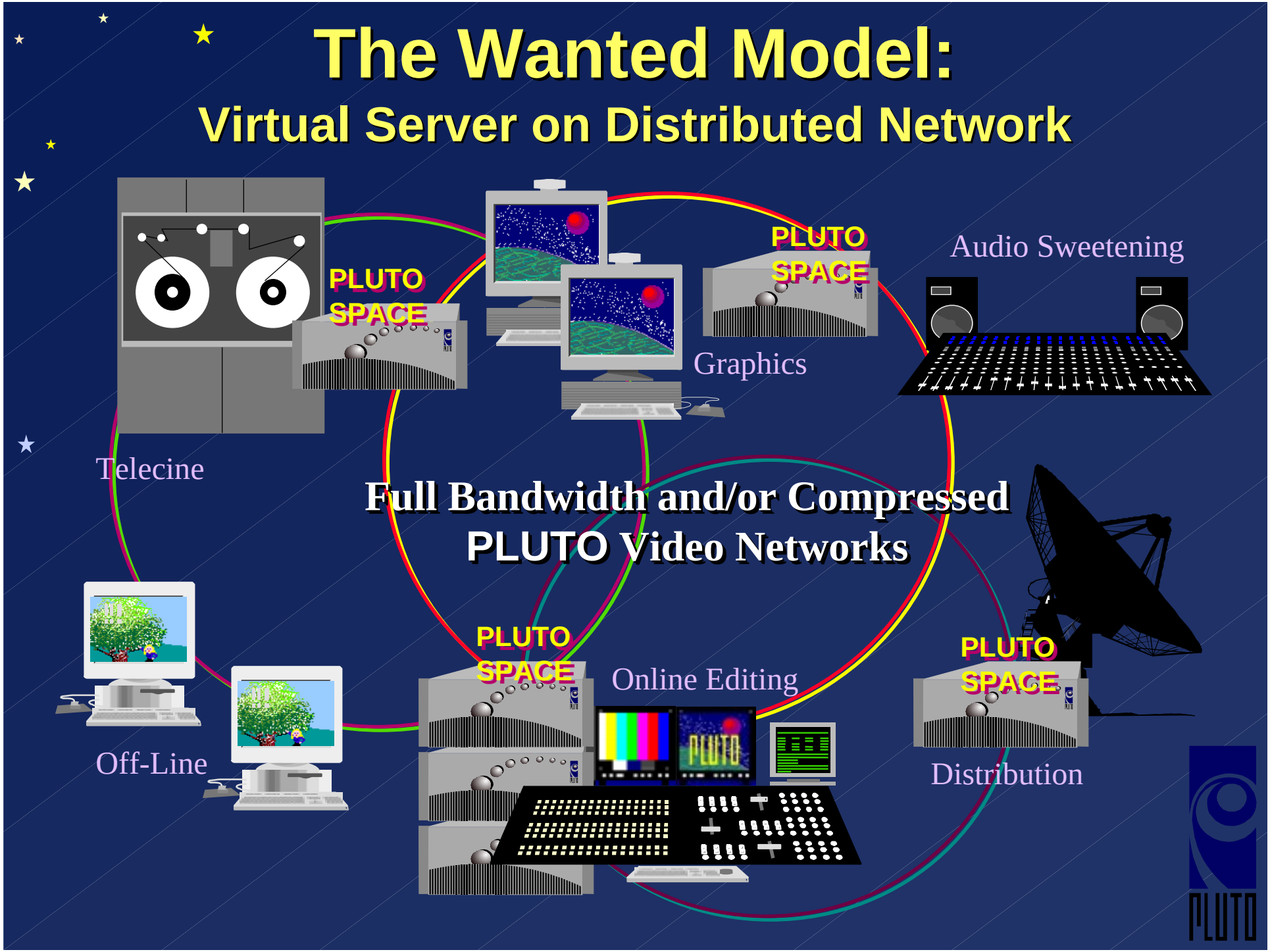
The Pluto Product Entry

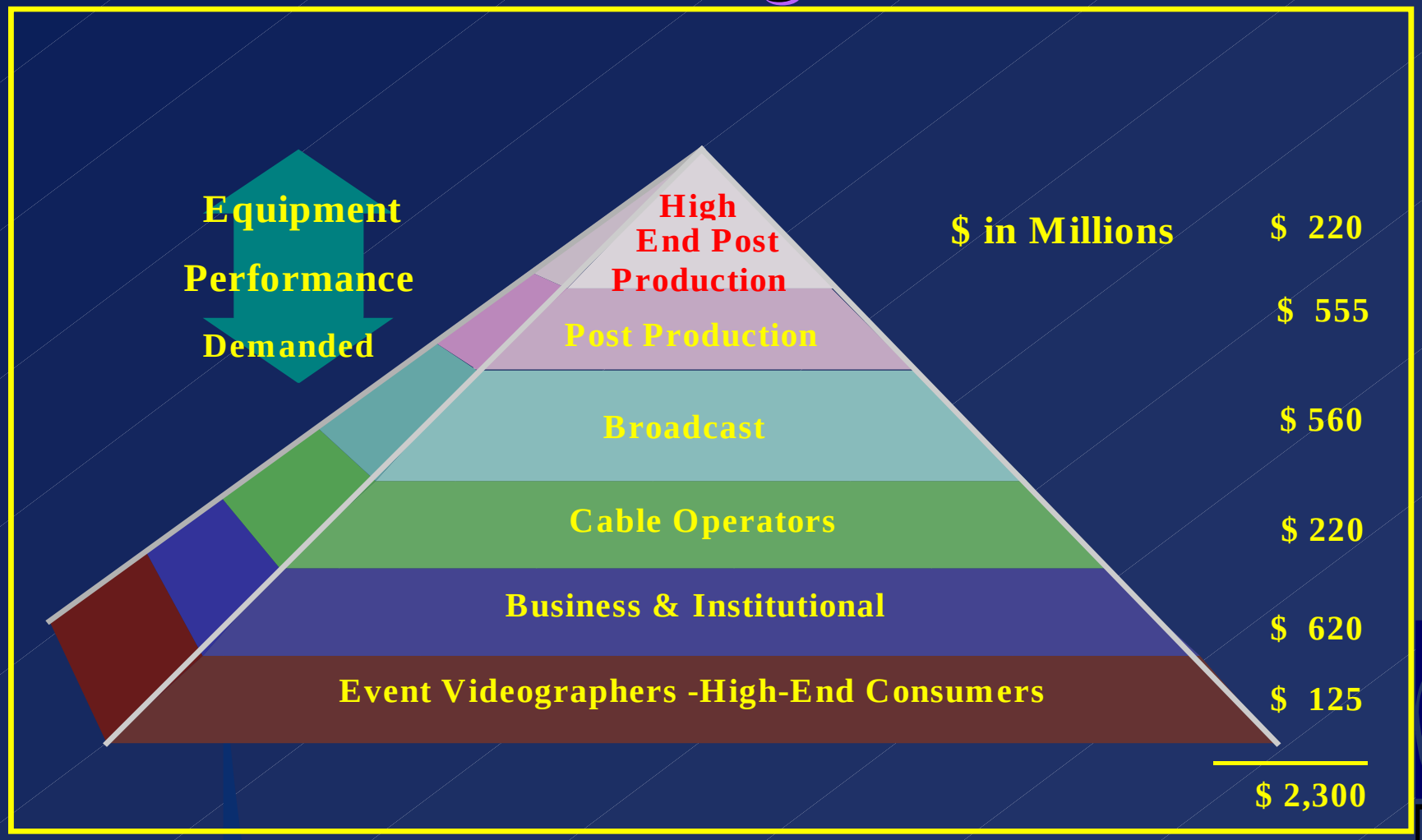


The Wanted Model:

Virtual Server on Distributed Network



1995 Storage Market Size by User Segment



1998 WORLD PROFESSIONAL DIGITAL VIDEO STORAGE MARKET

$3.0 Billion

Growing at 25-30%

Mass Storage Opportunity

- Production
  - HD storage needs 360-1500 Mb/s
  - SD storage needs 100-270Mb/s
- Broadcast
  - HD @ 50-360Mb/s
  - SD @ 19-25Mb/s
- Data Services
  - Data @ 1.2-4.2Mb/s
  - E-mail @ 1Kb/s
  - 100 Pagers @ 100 Kb/s

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Mass Storage
Multimedia Communication
From Internet to Digital TV

Mark Gray
Pluto Technologies