The Future Potential of Cable

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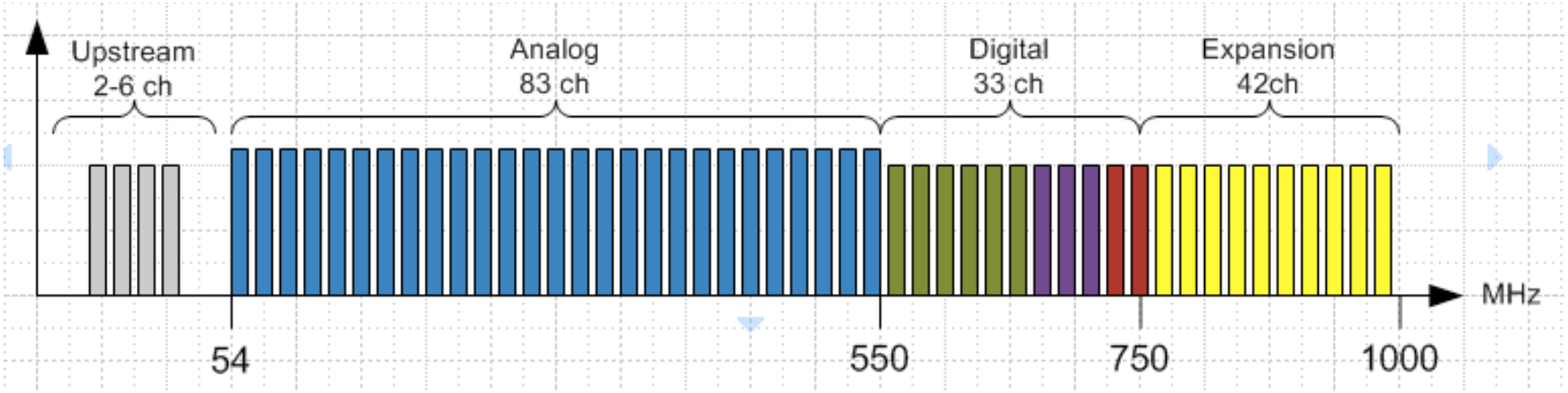
Typical Cable Spectrum

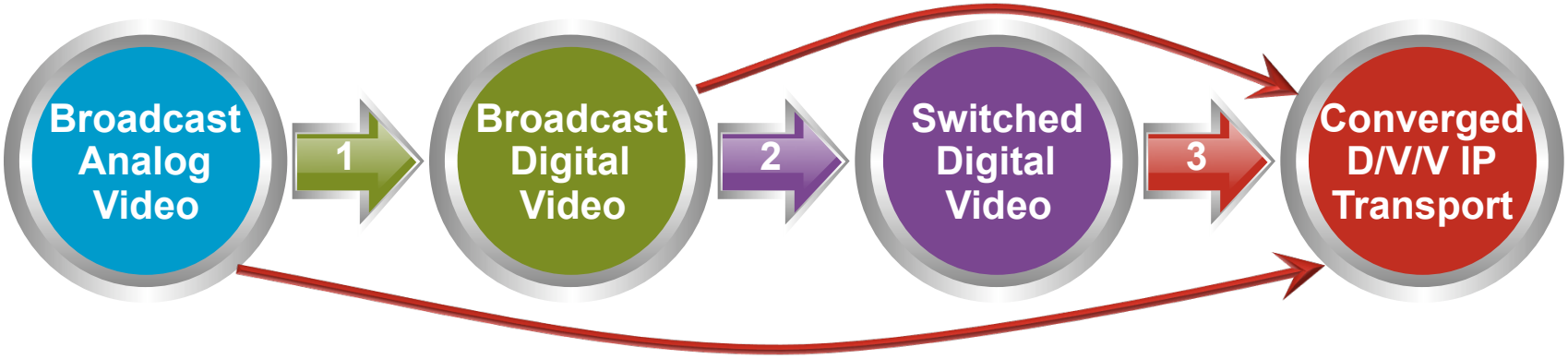


- 116 – 158 downstream carriers. Equivalent to 4.5 – 6 Gbps
- Legacy services under-utilize the available bandwidth.

  In this example, a 750 MHz plant is running at 10% efficiency. Thus, a 10x improvement can be made through migration of services.

Service	Broadcast Analog Video	Broadcast Digital Video	Switched Digital Video	Converged IP/DOCSIS Transport
Technology	NTSC	MPEG2	MPEG2	D3.0, MPEG4
Relative Bandwidth Efficiency	2%	20%	40%	100%

Three Step Plan for Cable



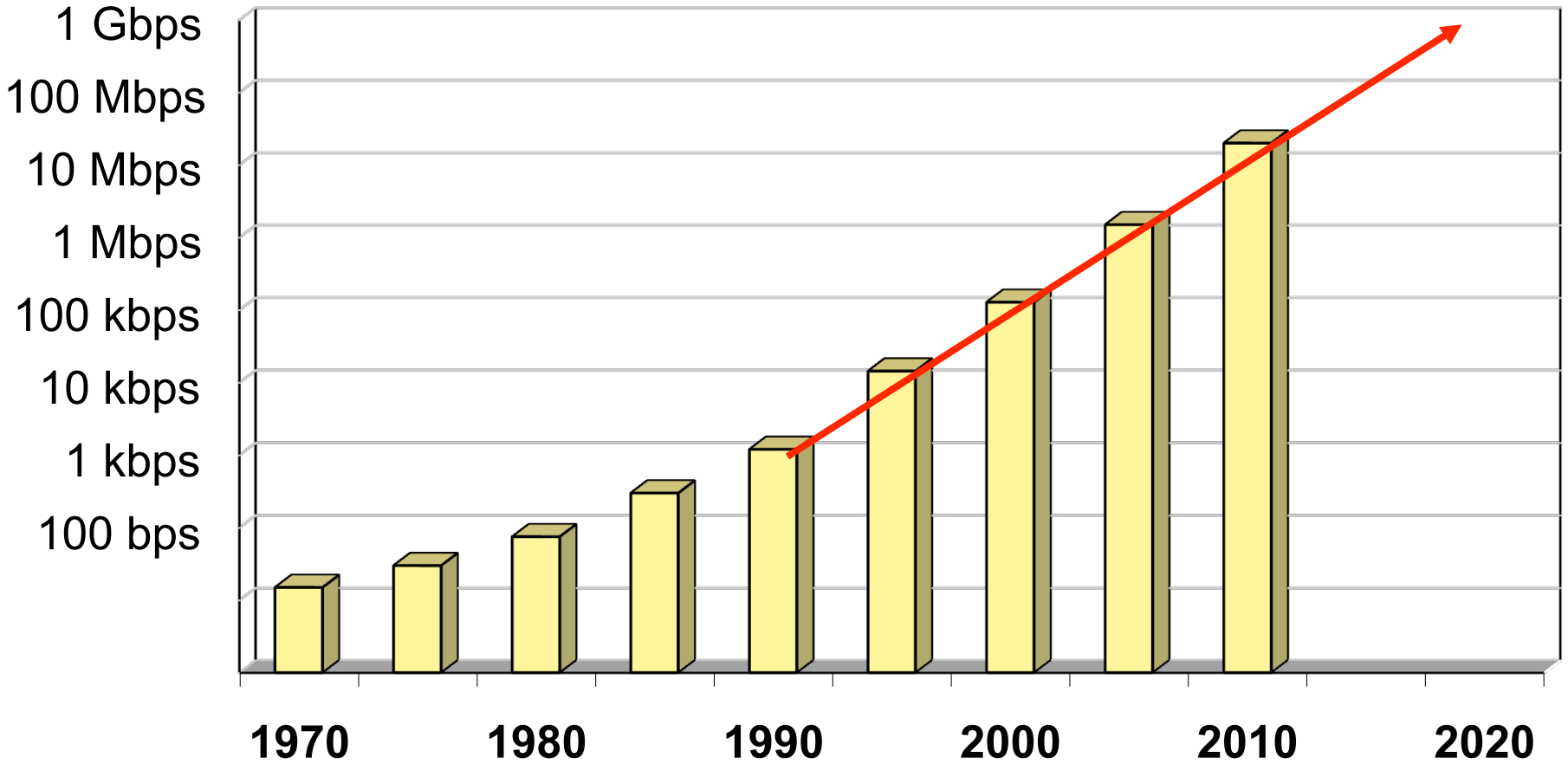
The National Broadband Plan can help by implementing policies that encourage:

1. Migration from analog video to digital video
2. Migration from broadcast video to switched digital video (SDV)
3. Migration from separate service transports to a single converged IP transport for all data, voice, and video.

DOCSIS

- DOCSIS is a technology for building a broadband pipe over the Cable HFC (Hybrid Fiber-Coax) network.
  - Standardized in 1996, DOCSIS works by putting IP packets onto the same radio frequency (RF) carriers that TV channels use.
  - Initial service tiers were 1-2 Mbps down and 384 kbps up.
  - Current service tiers are typically 12-24 Mbps down and 1-2 Mbps up.
- The latest version, DOCSIS 3.0, bonds multiple channels (4 to 8) channels together to create a larger pipe.
  - Service rates can be 20 to 200 Mbps in the downstream and 5 to 50 Mbps in the upstream.
- DOCSIS can eventually be scaled to 1 to 5 Gbps in the downstream and up to 1 Gbps in the upstream per node.
  - This is shared bandwidth per node. Today, the typical node group is 500 homes, but this can be reduced to 125 or lower as needed.

Growth in Consumer Bandwidth



If you are old enough to remember 300 baud modems, you will be young enough to see 1,000,000,000 bps (Gbps) modems

Two Most Important Concepts

- The Hybrid Fiber-Coax (HFC) plant the cable operators deploy has plenty of bandwidth potential.

  Upgrades can provide fiber-like performance at a fraction of the cost of deploying a new fiber network.

  IP and MPEG4 migration are critical parts of moving to more modern transports for increased network efficiency.

- Encourage Service Providers to continue to invest in their infrastructure.
  - Incremental upgrades will continually expand broadband capacity.