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MAKING BUSINESS SENSE OUT OF THE WIDEBAND PROTOCOL FOR A DOCSIS NETWORK

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Broadband Market Dynamics

Global shifts are changing the broadband landscape.

- Advanced technologies deployment
  - DSL, fiber, wireless
- Marketing hype capturing early mindshare
- Complex, bandwidth intensive services offered
- Competitive triple play offerings a reality
- $B upgrades on infrastructure planned

How can cable operators maintain their broadband leadership?

Cable's Bandwidth Leadership Gap

Case Study Details:
- 100K HHP with 500 HHP P/FN
- Service Group (SG): # of FN with equal service

Service	Channels		Digital BW	# SG	Capacity	
Analog	79	60%	x 3.75 Mbps	x 1 SG =	0.3 Gbps	3%
Digital	43	33%	x 38 Mbps	x 1 SG =	1.7 Gbps	15%
VOD	8	6%	x 38 Mbps	x 50 SG =	15 Gbps	72%
DOCSIS	9	7%	x 38 Mbps	x 50 SG =	2 Gbps	10%
Total	131				19 Gbps	

Bandwidth Used Today

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Capacity	131	x 38 Mbps	x 200 SG =	1000 Gbps

Potential Bandwidth

=

Efficiency Today 1.9%

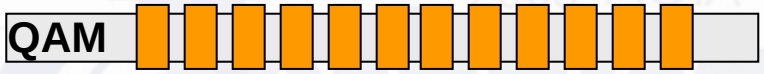
Change the Plant

Re-organize the bits

Don't allow 98% of your network to go unutilized!

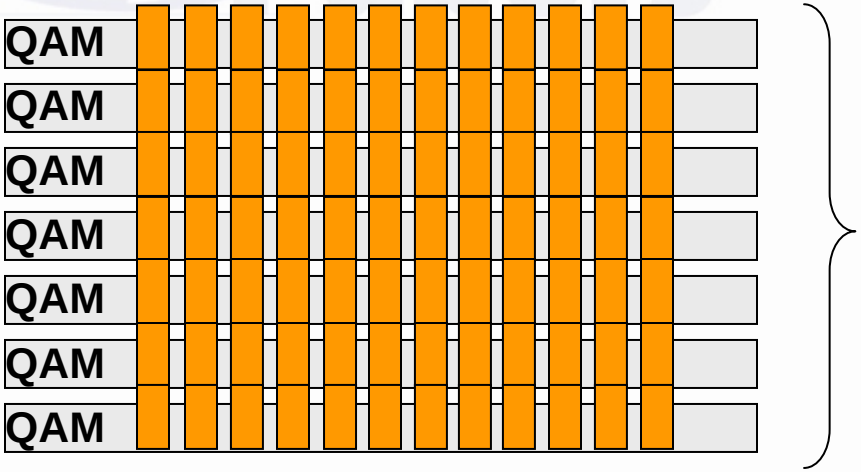
Optimizing HFC Packet Delivery with Wideband

Traditional DOCSIS Downstream Channel



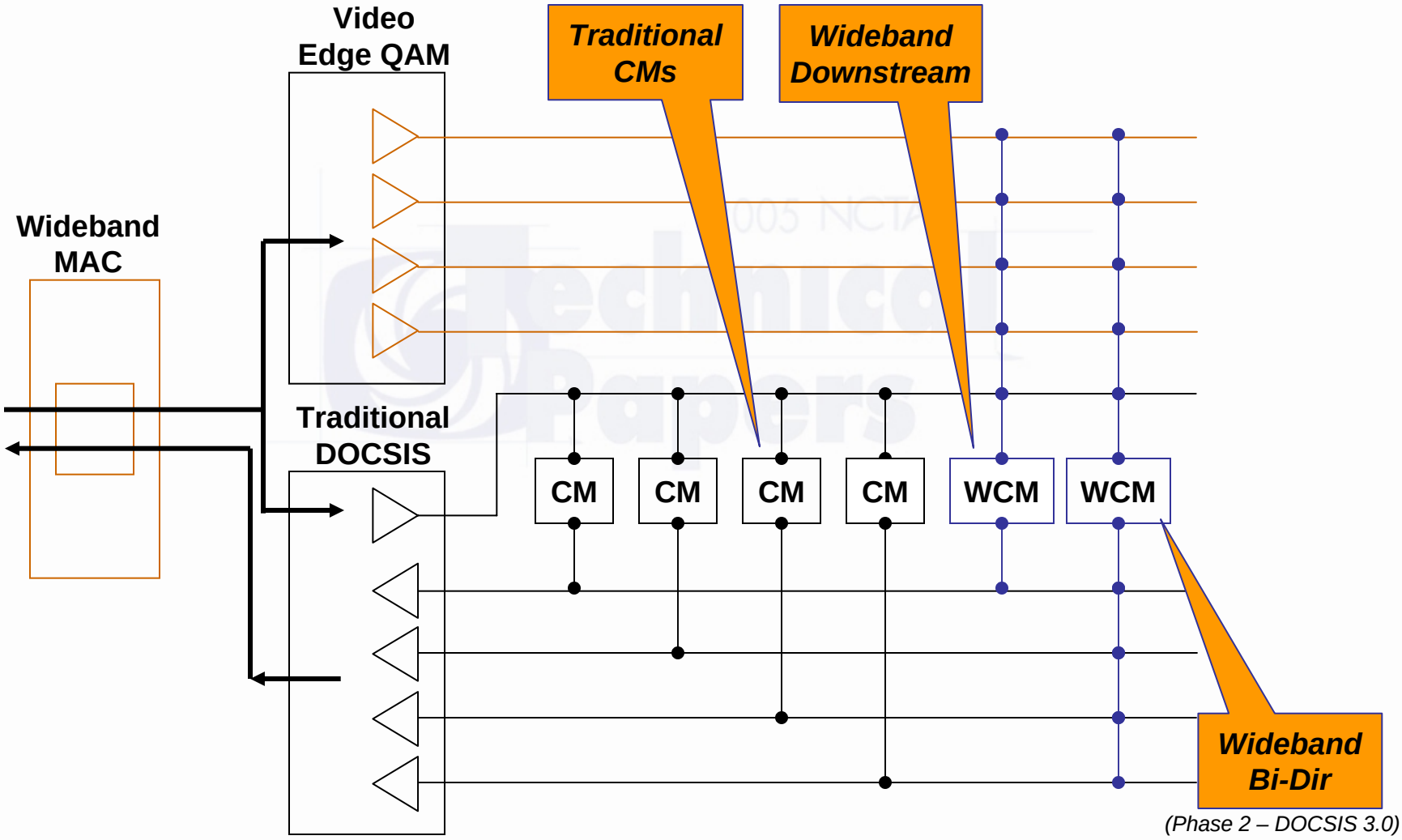
Single QAM Channel

Wideband Downstream Channel



Multiple QAM Channels

Wideband Architecture on Existing Deployments



(Phase 2 – DOCSIS 3.0)

Business Drivers for the Wideband Protocol

- **Increased Revenue**
  - Expanded subscriber base
  - Increased average revenue per user (ARPU)
- **Optimized CapEx Investment**
  - Leverage existing infrastructure
  - Reduced per port costs
  - Improved network efficiency
  - Scale to meet future requirements
- **Minimized Operational Costs**
  - Compatibility with DOCSIS 1.x/2.0

Expanded Customer Base/Increased ARPU

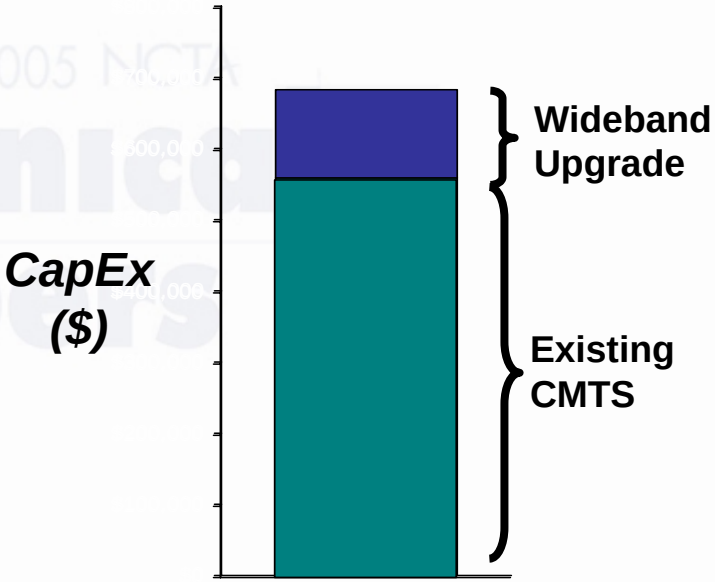
Access Provider - Technology	Offered Throughput
Competitive Carrier - Fiber Overbuild	100 Mbps +
Incumbent Carrier- DSL	25 Mbps
Cable Operator	8 Mbps
Wireless/Satellite Provider	2 Mbps

- Combat competitive technologies
- Demonstrate throughput leadership
- Attract/retain customers

- "Trade Up" to higher service tiers
- Support streaming content services
- Drive increased ARPU

Fully Leverage Existing Cable Infrastructure

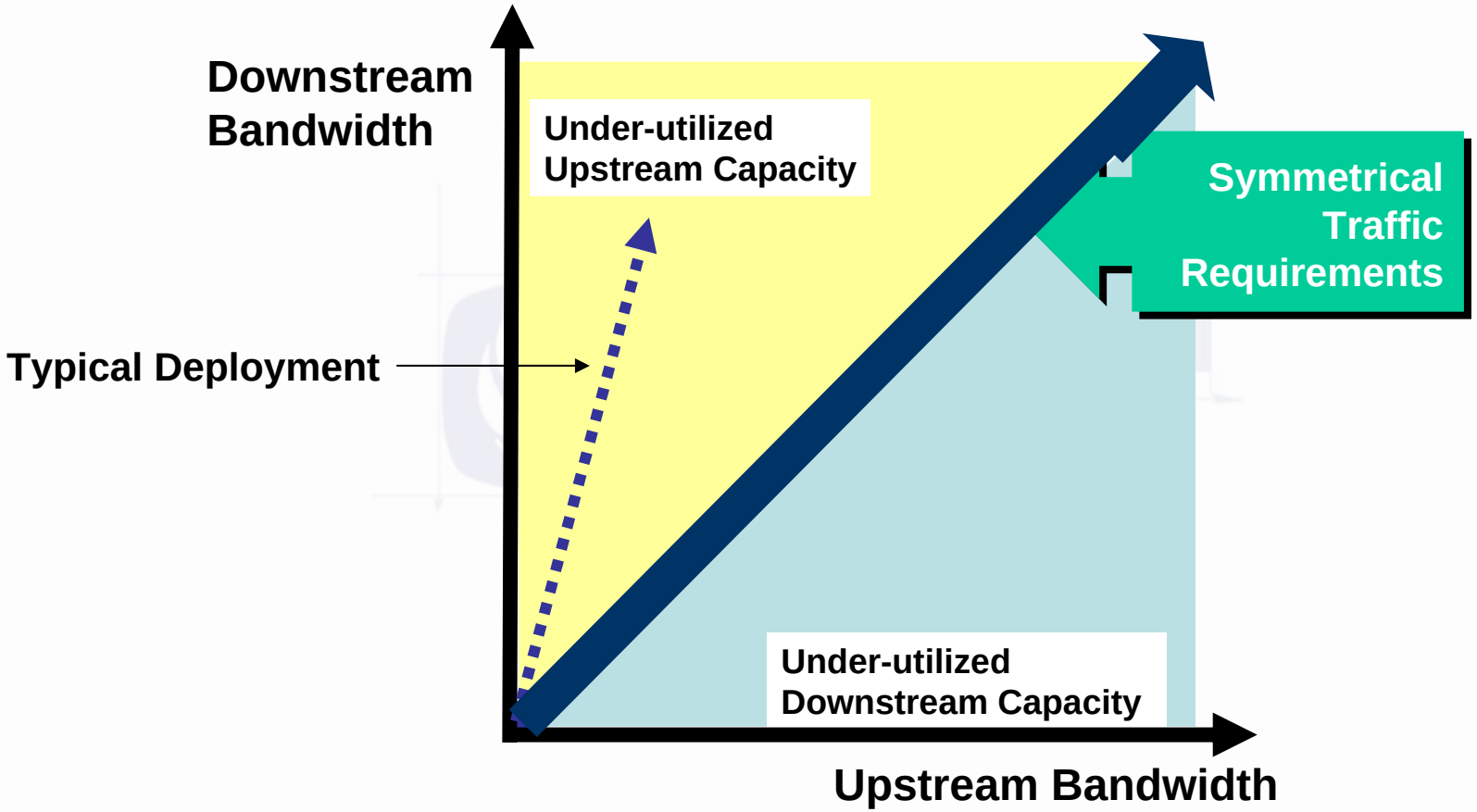
- **Exploit HFC Plant Potential**
  - Gig E throughput speeds achievable using current modulation techniques
  - No expensive plant upgrades / maintenance required
- **Leverage Existing Equipment**
  - Upgrade to existing CMTSs
  - Low incremental cost



Wideband Objective:

10x the bandwidth at 1/10th the cost!

Eliminate Stranded Ports

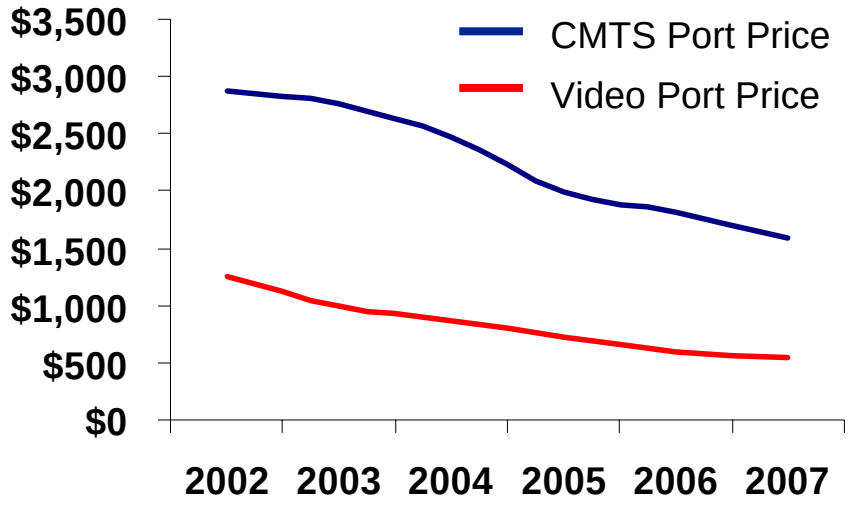


Wideband protocol leverages modular CMTS initiative to allow US/DS ports to be added independently of one another

Reduced DOCSIS Ports Cost

Downstream QAM cost:

- Capitalizes on existing lower cost asynchronous edge QAM devices
- Offers an early implementation of the Modular CMTS architecture



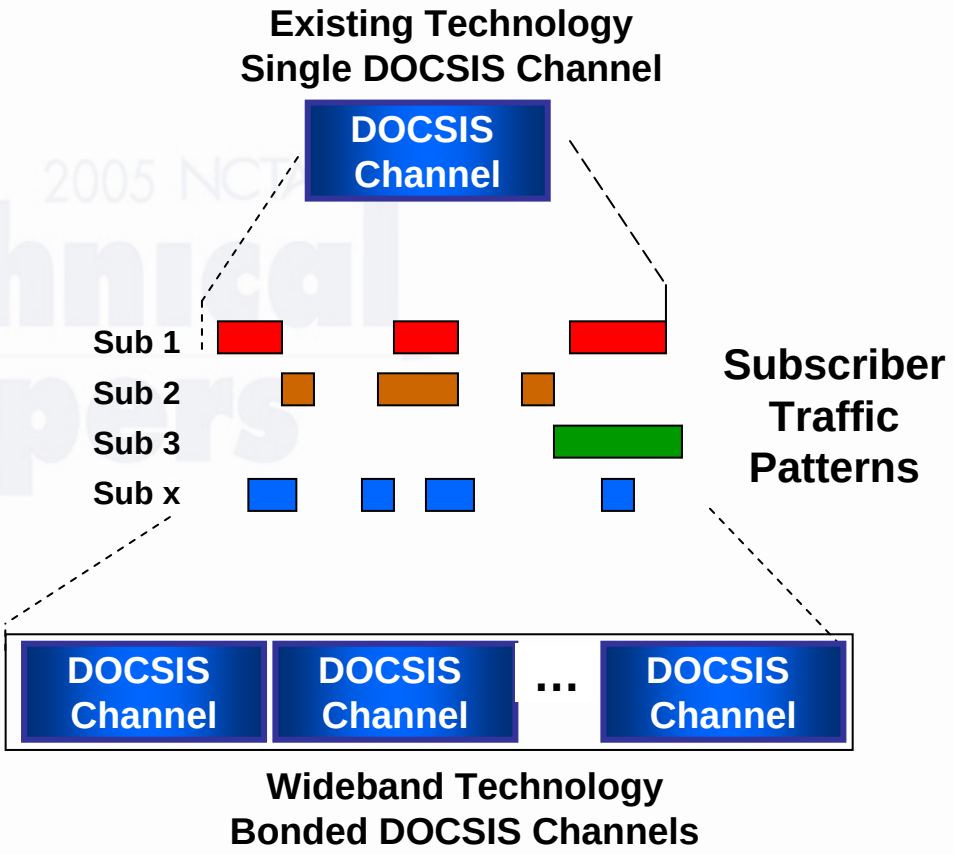
CMTS - Video Port Cost Comparison

Source: InStat/MDR 2004, Infonetics 2004, Cisco Analysis 2005

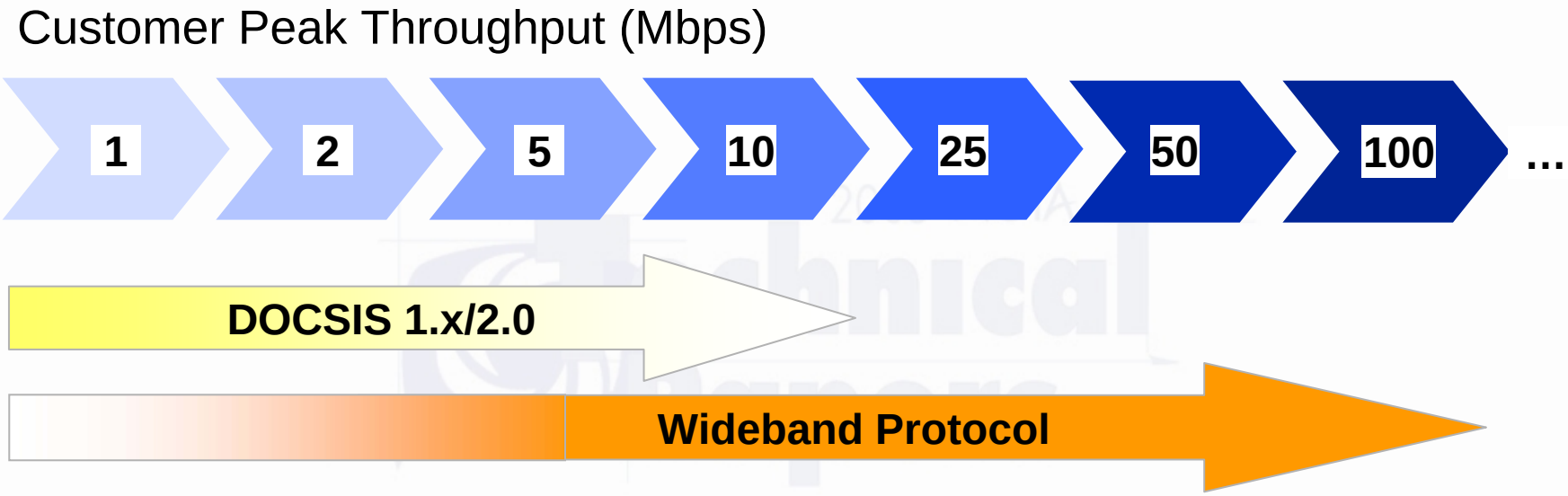
Improved Network Efficiency

"Fat Pipe" Benefits

- Improves network utilization
- Offers statistical multiplexing gains
- Improves oversubscription
- Mitigates effect of move towards streaming content



DOCSIS 1.x/2.0 Compatibility and Future Scaling



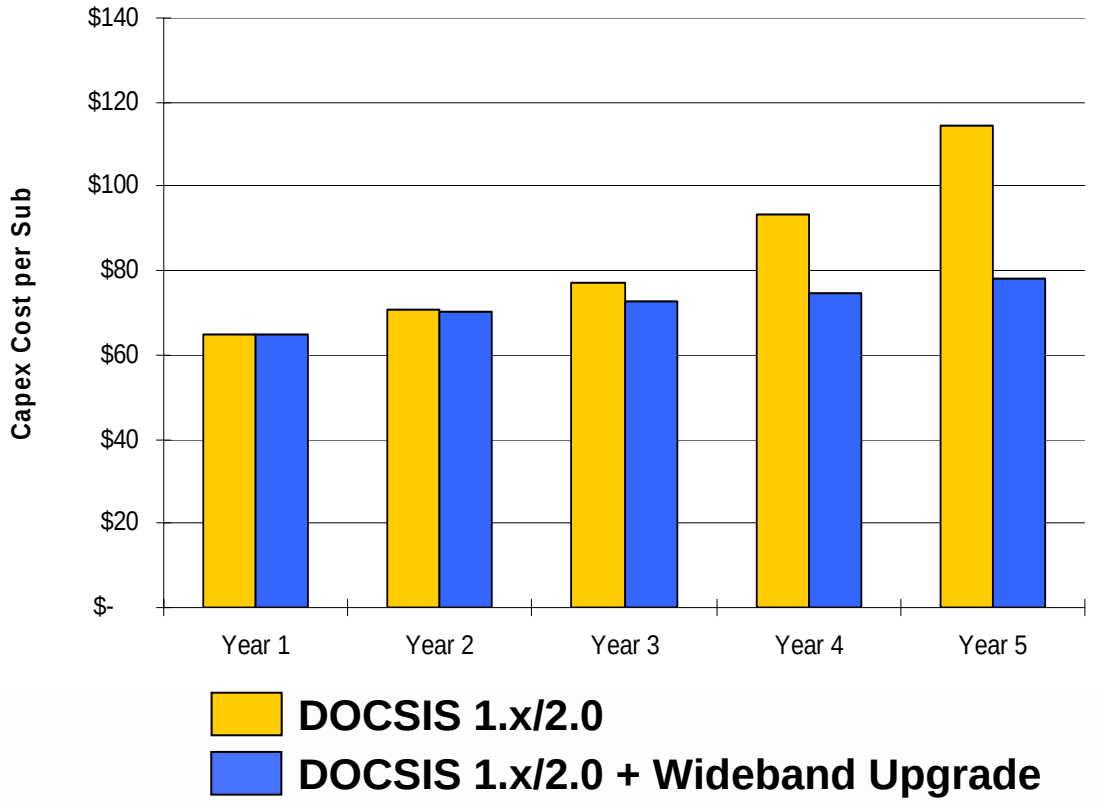
Ability to support data services of 100 Mbps and higher.

Evolutionary approach:

- Maintain DOCSIS 1.x/2.0 technology for low service tiers
- Introduce wideband as service demands increase
- Simultaneously serve all customers in a cost-effective manner

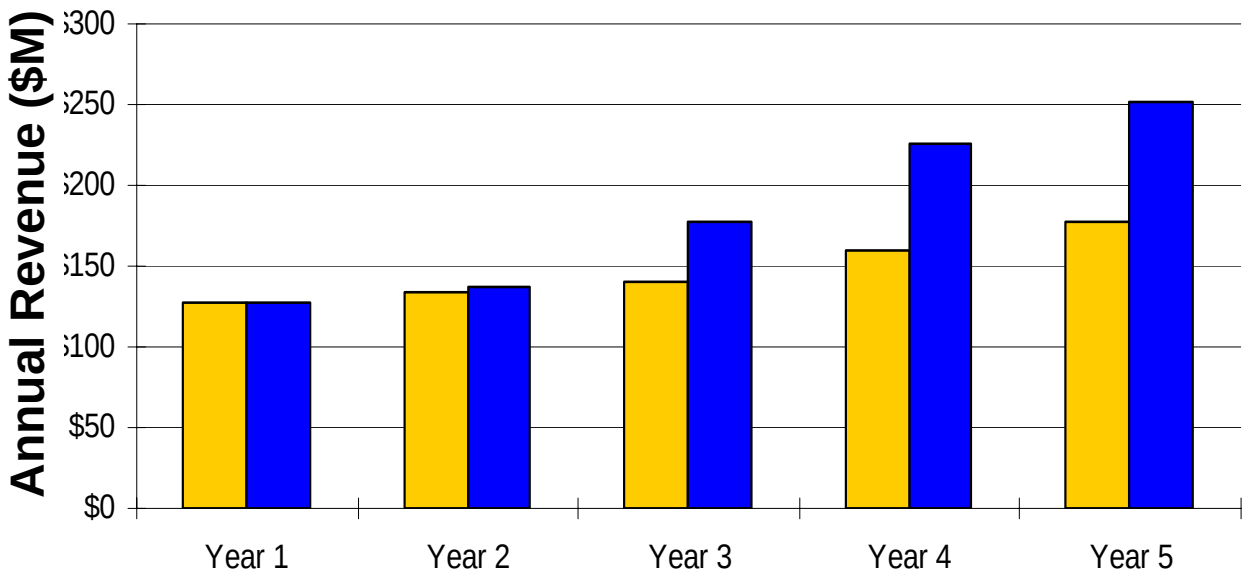
Wideband vs. DOCSIS 1.x/2.0 CapEx Comparison

- **Optimize potential of HFC network**
- **Drive down CapEx as throughput increases**
- **Gracefully insert into DOCSIS 1.x/2.0 deployments**



Service Mix - Peak 2 – 25 Mbps per sub

Impact of Wideband on Overall Business Plan



Business Case Improvements:

- **Expanded service set: up to 100+ Mbps/sub**
- **60 percent reduction in CapEx per Mbps**
- **Increased ARPU: $10-$20 per month**
- **Improved operating margins (500-700 basis points)**

Wideband Protocol gives cable operators the ability to sustain and increase their broadband leadership.

- **Provides powerful competitive tool for broadband speed competition**
- **Enables advanced IP services to attract new subscribers, reduce churn rate, and generate revenues**
- **Leverages previous investments in HFC plant and CMTS equipment**
- **Overlays easily on existing deployments without requiring changes to operations**