

Video over IP


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Korea Cable Summit

May 14-15, 2002

Agenda

- **Digital video migration**
- **Video over IP to the hub**
- **Video over IP to the home**
- **Scaling the network for new video services**



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Digital Video Migration

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Objectives of Digital Video Migration

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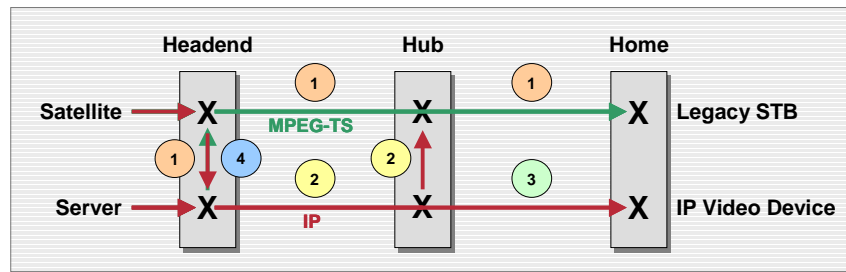
- Reduce overall network costs
- Improve network flexibility, reliability, availability, scalability
- Enable more services to more devices
- Create multi-vendor environment

Any content. Any place. Any time.
Anything less is a compromise!

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Digital Video Migration

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- 1 MPEG-TS: The way the world is today
- 2 Video over IP to the Hub
- 3 Introduction of IP Video Device
- 4 Full Video Over IP to the Home

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Why Migrate Video to IP?

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IP enables two key network capabilities lacking in current digital video networks:

- **Performing intelligent network services** such as routing, QoS, traffic engineering and security using proven, standards-based protocols
- **Connecting any source to any destination** using flexible routing/switching

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Video Market is Changing... Flexibility is Important!

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- **DVD experience is rapidly becoming the benchmark, not VHS tape rentals**
- **S-VOD very popular—but breaks traditional VOD engineering assumptions**
- **Network-PVR on industry radar screen...usage rates & access patterns totally different from Movies On Demand!**
- **Blockbuster trialing subscription biz models...satellite putting disks in growing percentage of boxes...**
- **Studios experimenting with direct VoD approach over Internet (iVoD)**

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Video over IP to the Hub

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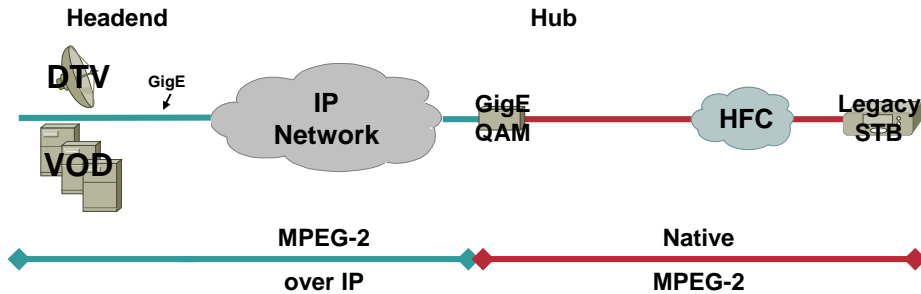
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Video over IP to the Hub

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- Lower server cost per stream
- Lower transport cost per stream
- Greater network flexibility, scalability
- Overlay services on existing HFC and STB
- Convergence to common infrastructure
- Building block for future video over IP to the home

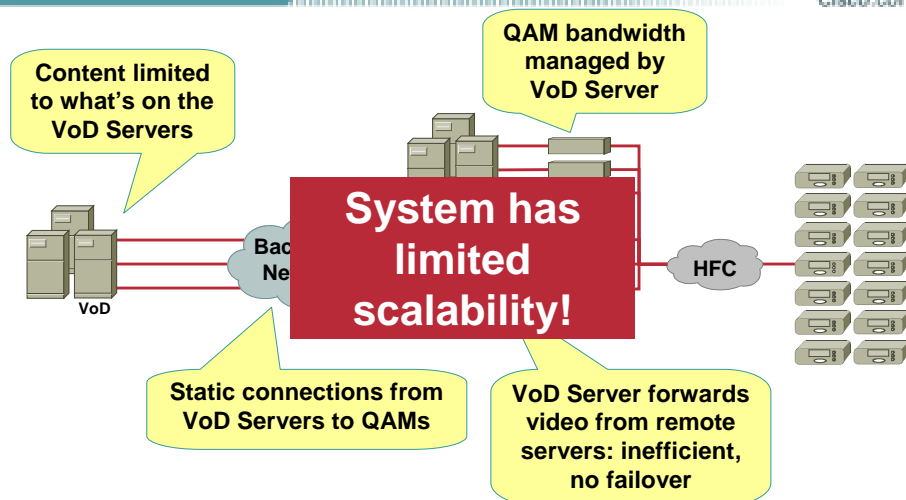
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Current VoD System

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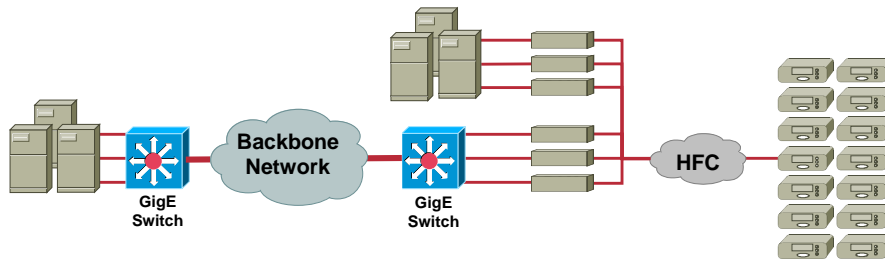
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VoD with GigE Switching

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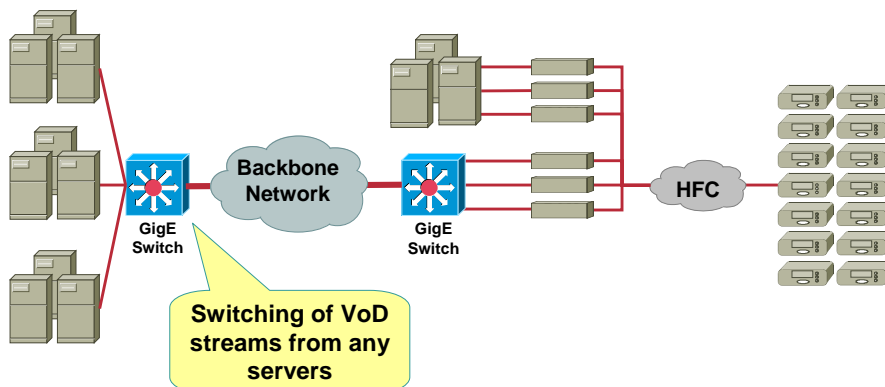
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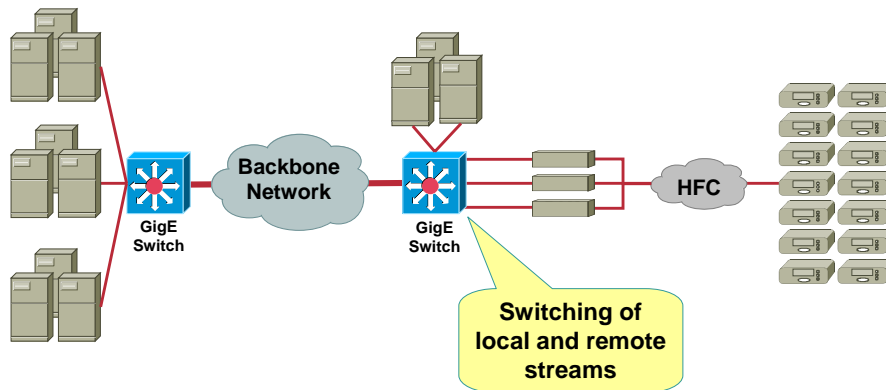
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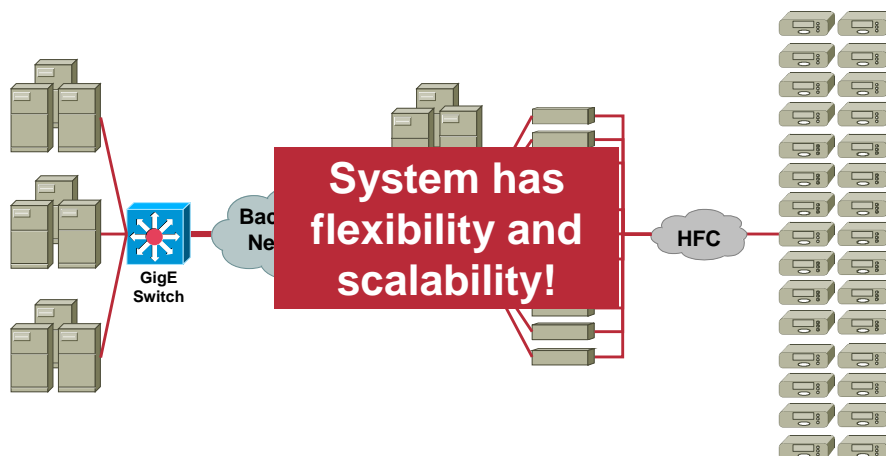
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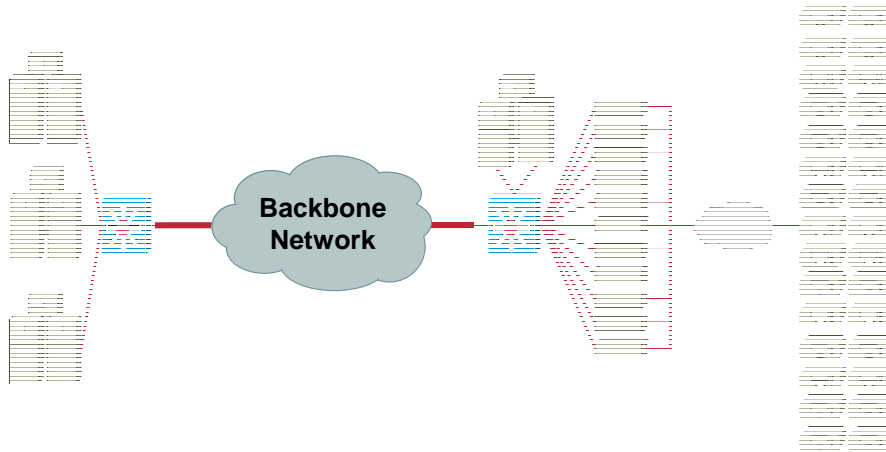
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Backbone Network Solutions

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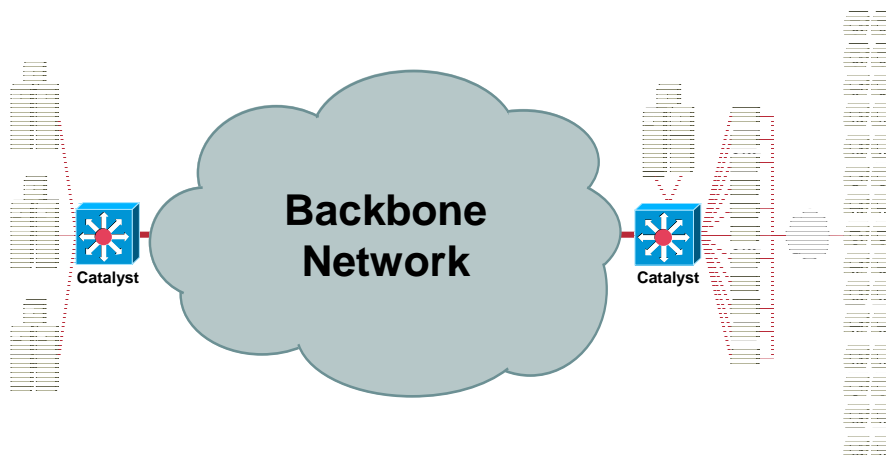
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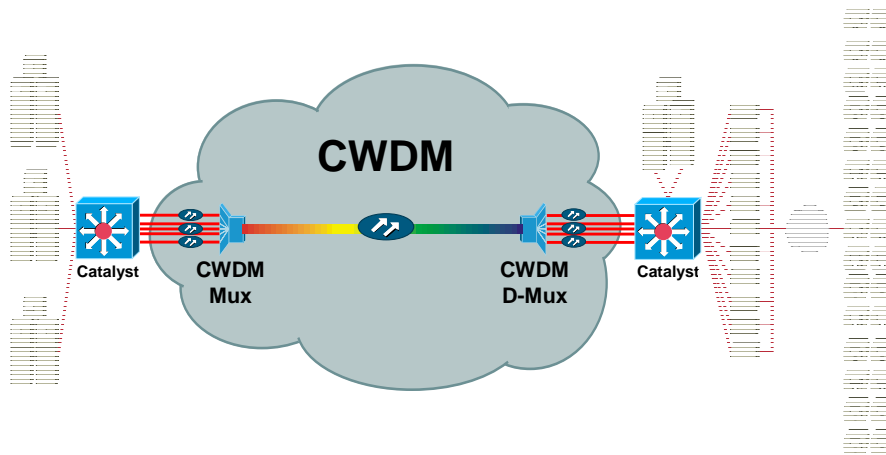
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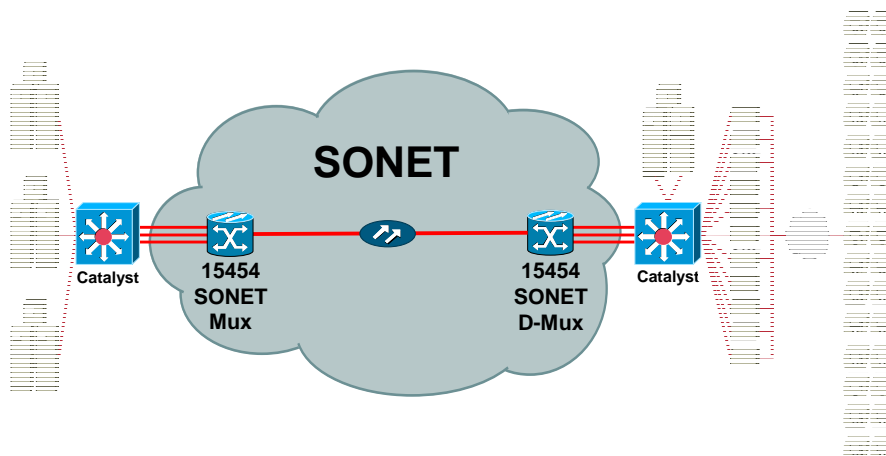
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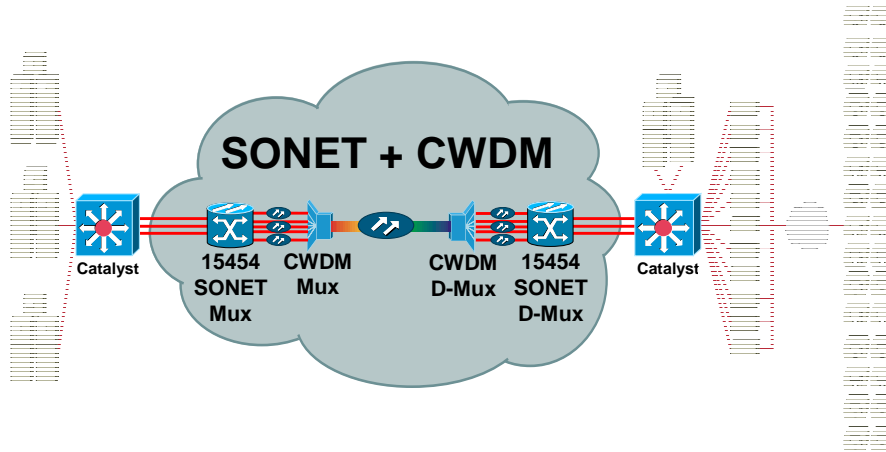
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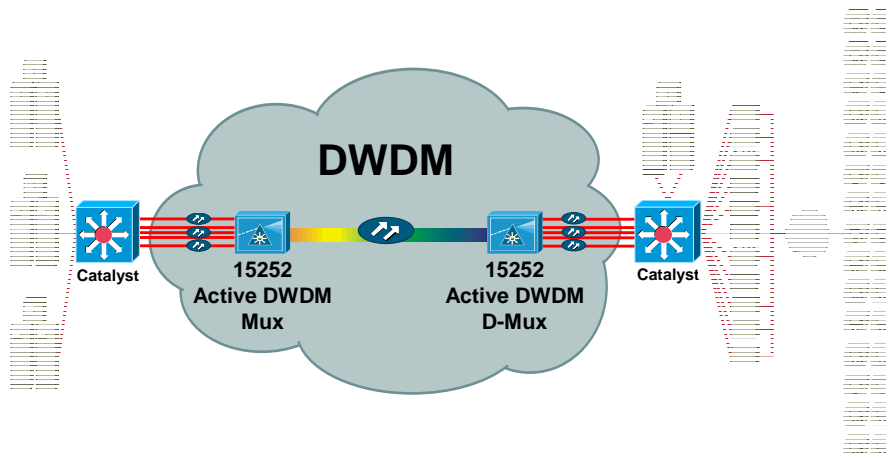
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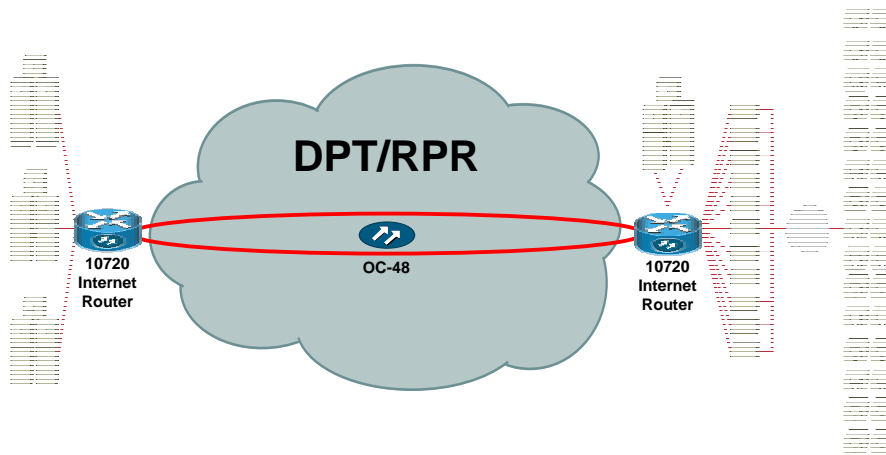
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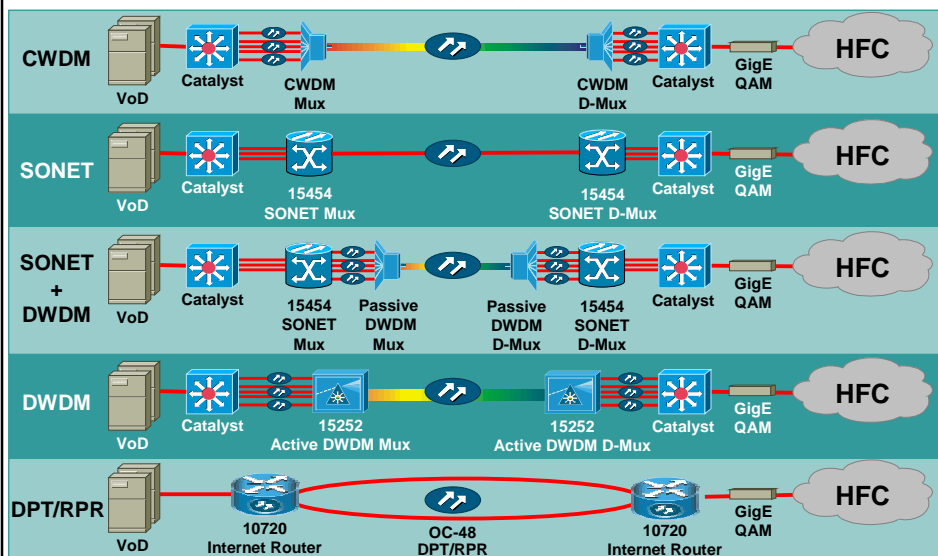
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Summary of Backbone Network Solutions

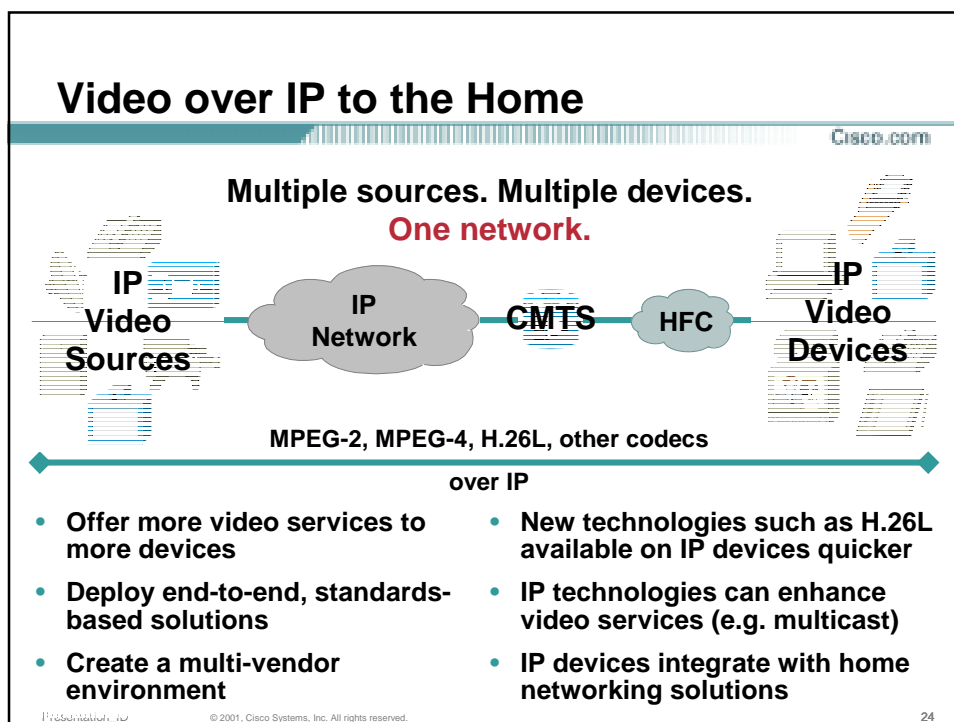
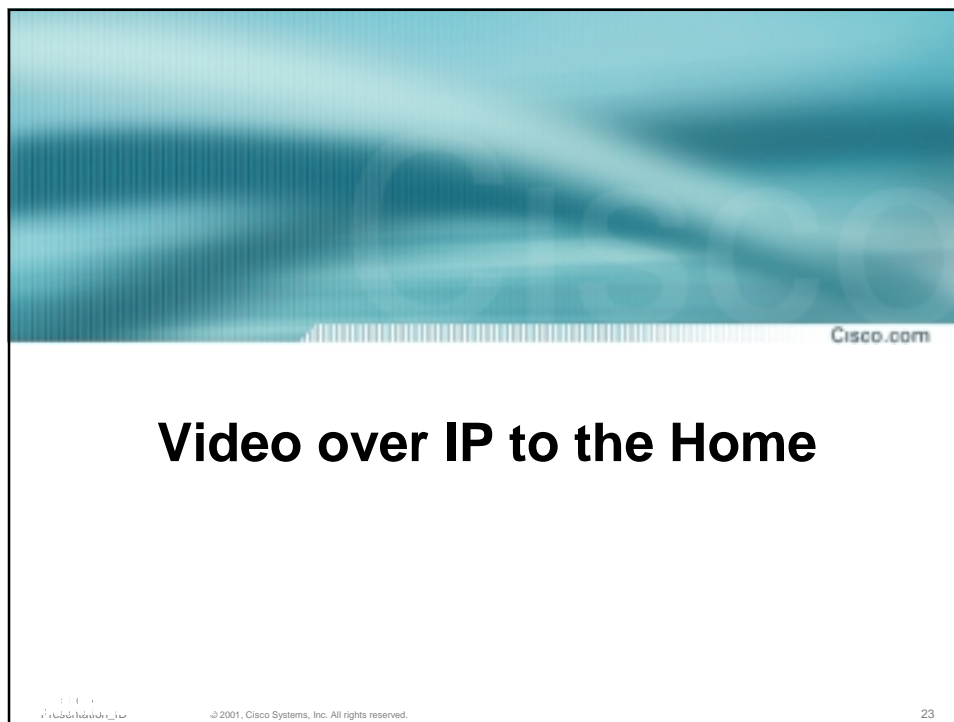
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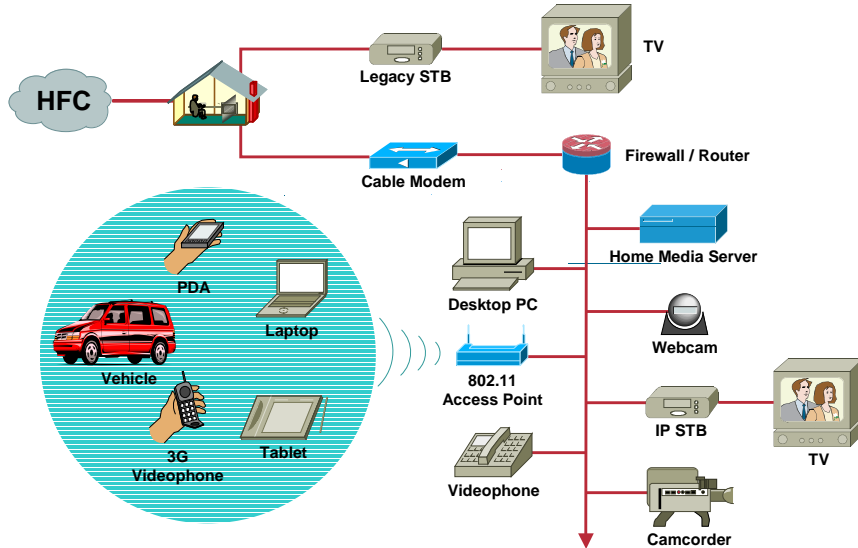
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Explosion of IP Video Devices

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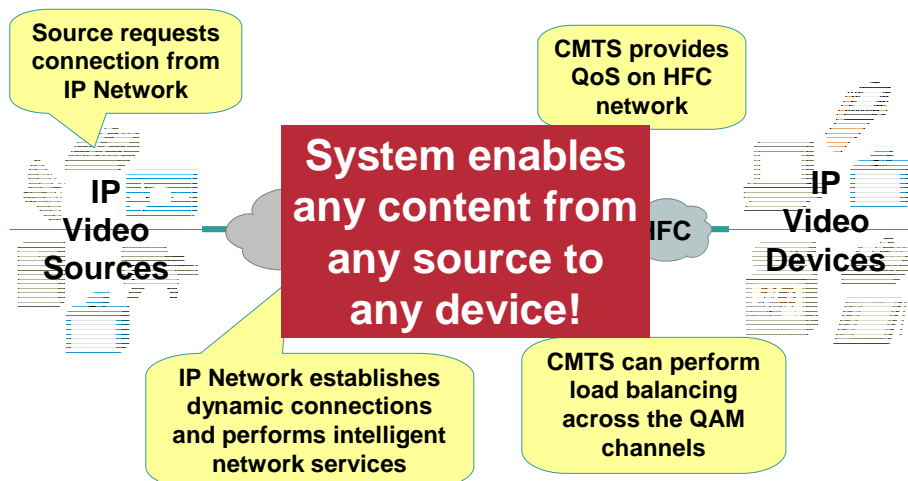
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Video over IP to the Home

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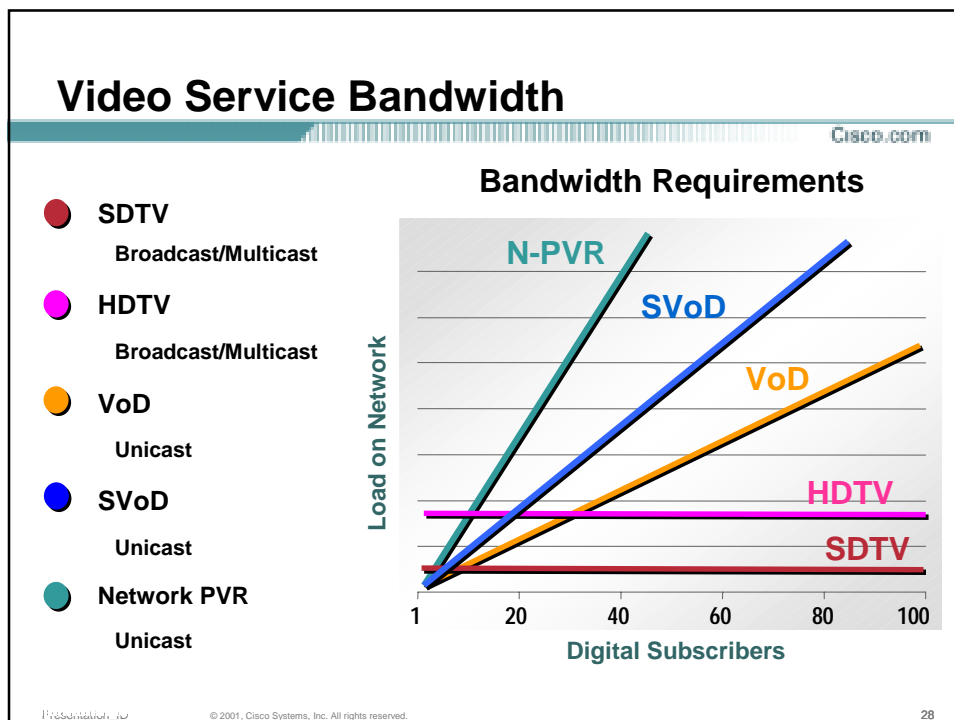
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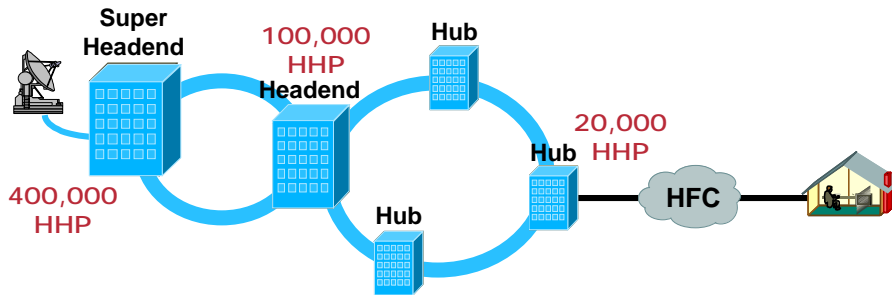
Scaling the Network for Video over IP

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Backbone Network Sizing for New Video Services

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Service	VoD	S-VoD	N-PVR	
Video stream rate	3.75	3.75	3.75	Mbps
Digital penetration	25%	25%	50%	
Peak rate	10%	25%	50%	
Hub traffic aggregate	1.9	4.7	18.8	Gbps
Headend traffic aggregate	9.4	23	94	Gbps
Superheadend traffic aggregate	38	94	375	Gbps

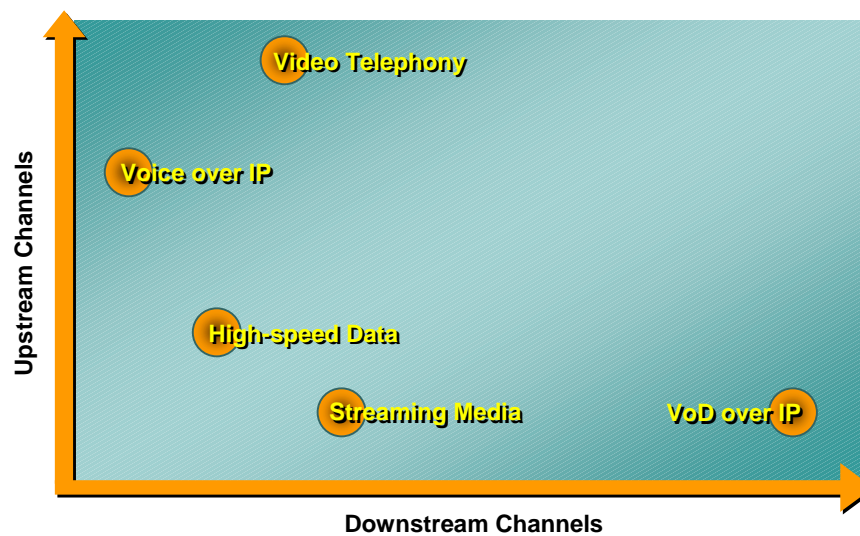
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DOCSIS Network Sizing

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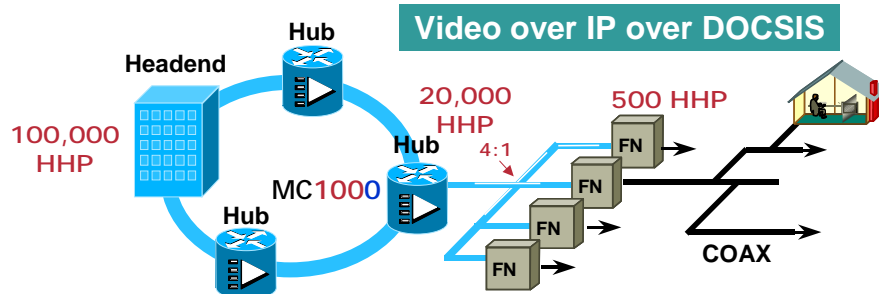
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DOCSIS Network Sizing for New Video Services

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Service	HSD	VoD	S-VoD	N-PVR
DS channels per hub	2	70	174	695
Service penetration	10%	25%	25%	50%
Peak rate	20%	10%	25%	50%
DS data rate per user (Kbps)	135	3750	3750	3750

DS = Downstream; HSD = High-speed data

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Summary

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Summary

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- **New video services for a variety of video devices provide new revenue opportunities**
- **Video services are changing—video over IP provides flexibility to rapidly adjust to consumer behavior**
- **Video network migration is underway with VoD**
- **Common network backbone scales without a fork-lift upgrade**
- **New video services will drive future DOCSIS network architectures that deliver high bandwidth at cost levels that fit the business case**

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