



Cable Access Migration to Converged Cable Access Platform (CCAP)

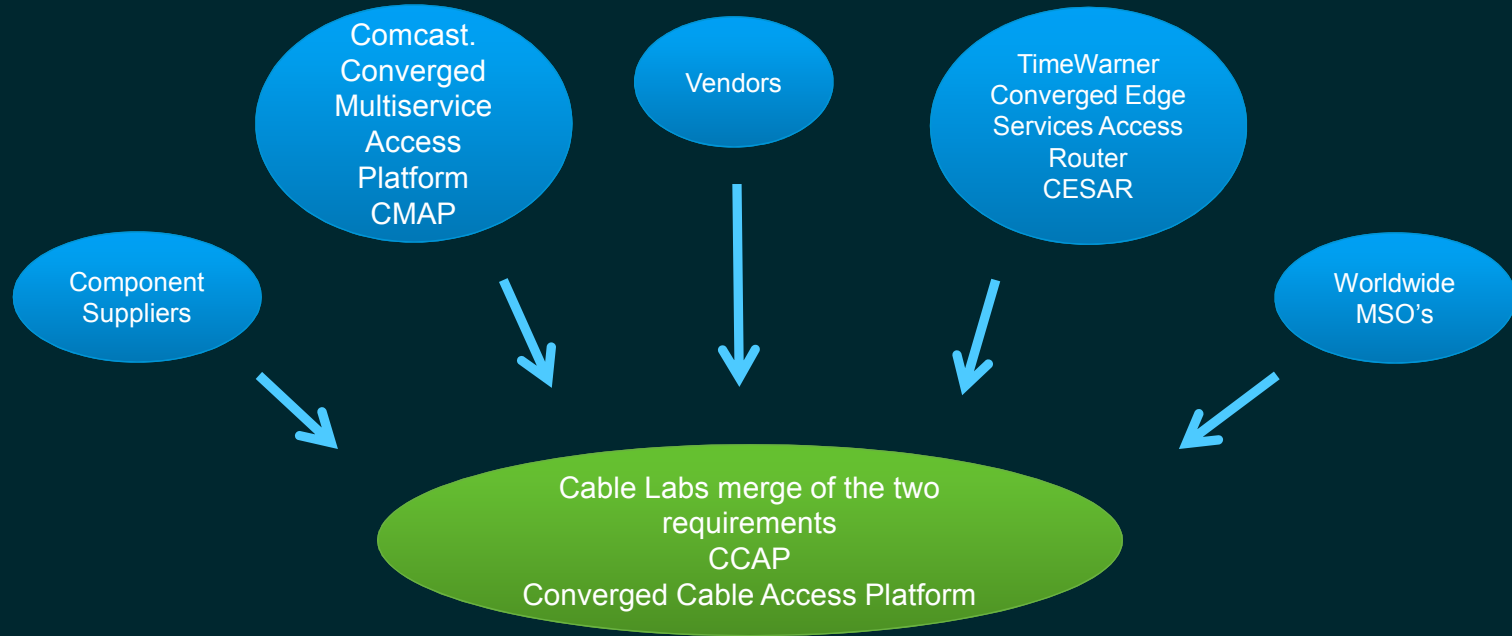
Todd McCrum
Sr. Director, Product Marketing

Dec 4th 2012

Agenda

- CCAP Introduction
- What's Driving CCAP and Convergence
- The “Cable Operator Challenge”
- Operation Efficiencies Example
- Next Generation Access – DOCSIS 3.1

CCAP



CCAP Fundamentals

- The Converged Cable Access Platform (CCAP) is intended to provide a new equipment architecture option for manufacturers to achieve the **Edge QAM and CMTS** densities that MSOs require in order to address **the costs and operational challenges** resulting from the success of narrowcast services.
- CCAP leverages existing technologies, DOCSIS3.0, MHA and can also include new technologies such as EoC /EPOC and integrated optics.

Key Points CCAP – Goals

- **Convergence:** Flexible use of QAMs between video and data services through a single point of configuration improves densities and OPEX
- **Operational Simplification:**
 - Dedicated QAM channels to narrowcast Service Groups: specific HSi/Voice service group, VOD Service Group and SDV service group
 - QAM Replication: Implementation of separate sets of QAM channels for NC and BC so the NC (inc DOCSIS) can be configured on a unique basis and Broadcast Channels shared across ports in the Downstream line card DLC
 - Simplification of the RF combining to enable all digital services from a single port
 - An option to add content scrambling for both standards based and proprietary without any additional HW – as to aid “interoperability” between platform vendors and to minimise platform complexity

What's Driving CCAP and Convergence?

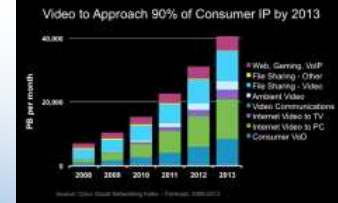


Market Dynamics

Video Intensive, Multi-platform, Personal, and Interactive

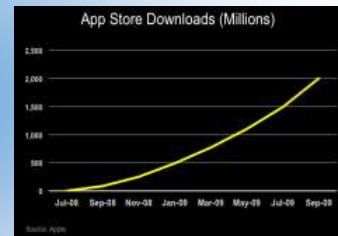
Massive Video Growth

- Rapid growth in HD and VoD services
- Video expected to be 90% of consumer internet traffic by 2013
- Content owners looking for new outlets with piracy protection



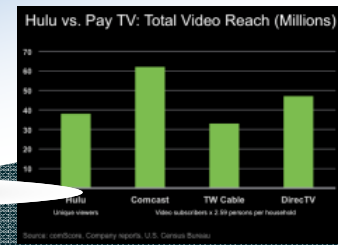
Personalization and Interactivity

- Consumers want to watch what they want, when and where they want
- Consumers want custom applications & user interfaces
- 36 bn apps will be downloaded in 2012 with 83% from Android and iOS devices
- 1 billion apps downloaded per month from Apple iTunes store alone

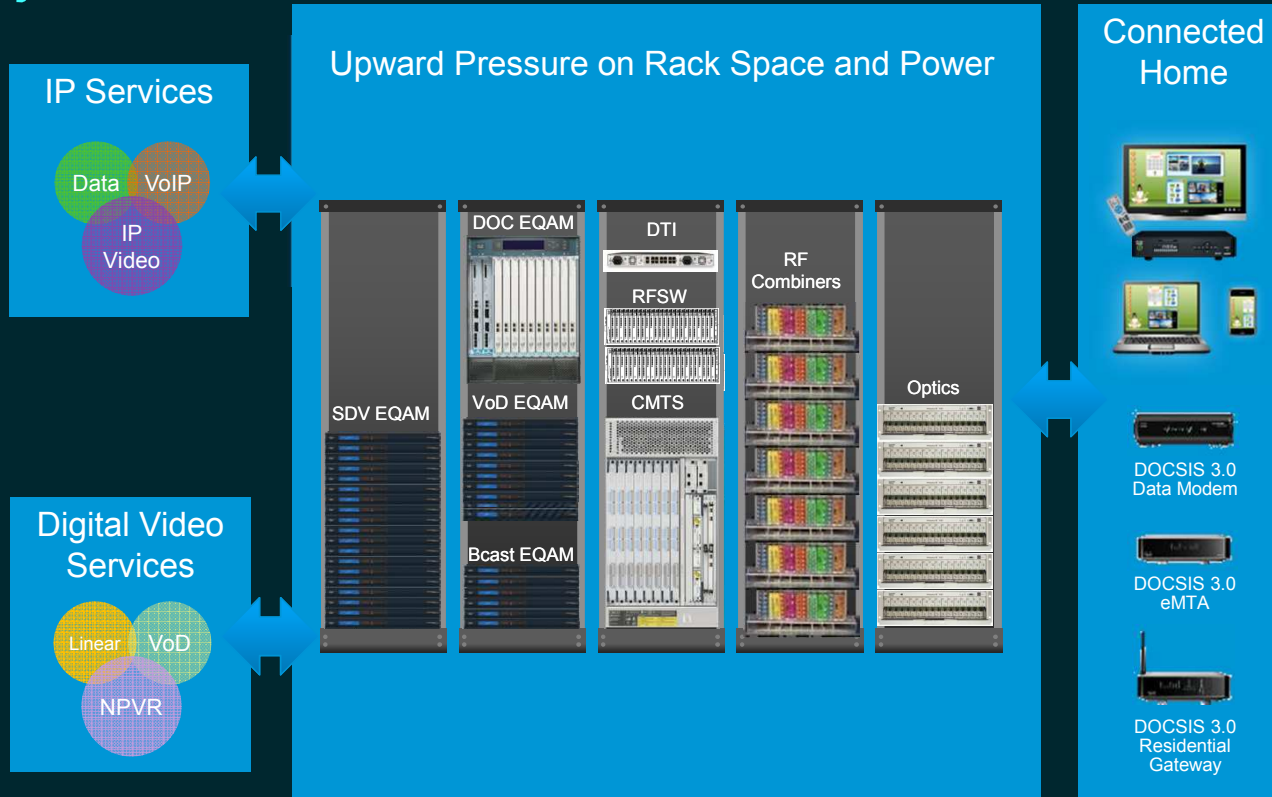


Multi-Screen Entertainment and Information

- Internet video increasing in quantity
- Broadband speeds & streaming technology improving
- Consumers looking for content on multiple devices



Today's Cable Access Network



Cable Operator Challenges to Meet the Video Traffic Growth

More Video + More Devices = More Traffic

- More Video
- More Devices



- More Personal
- More Interactive

Keep up with
unprecedented
bandwidth growth



Pressure to
optimize
rack space




Migrate to
new network
architectures
existing infrastructure



A Phased Approach to Meet Today's Challenges with Scale and Convergence


Reduce OPEX



Phase 1

Scaling DOCSIS downstream capacity and converging into a high density UEQAM


Maximize ROI



Phase 2

Maximizing and scaling downstream capacity with the existing platform

Unprecedented Scale



Phase 3

Optimizing OPEX savings with a high density, next generation cable access platform, beyond 1Gbps/SG

Cable Access Migration Execution Strategy

Cable MSO Blueprint: Optimize and Monetize Existing Infrastructure

Phase 3 – Unprecedented Scale

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assis

Phase 2 – Maximize ROI

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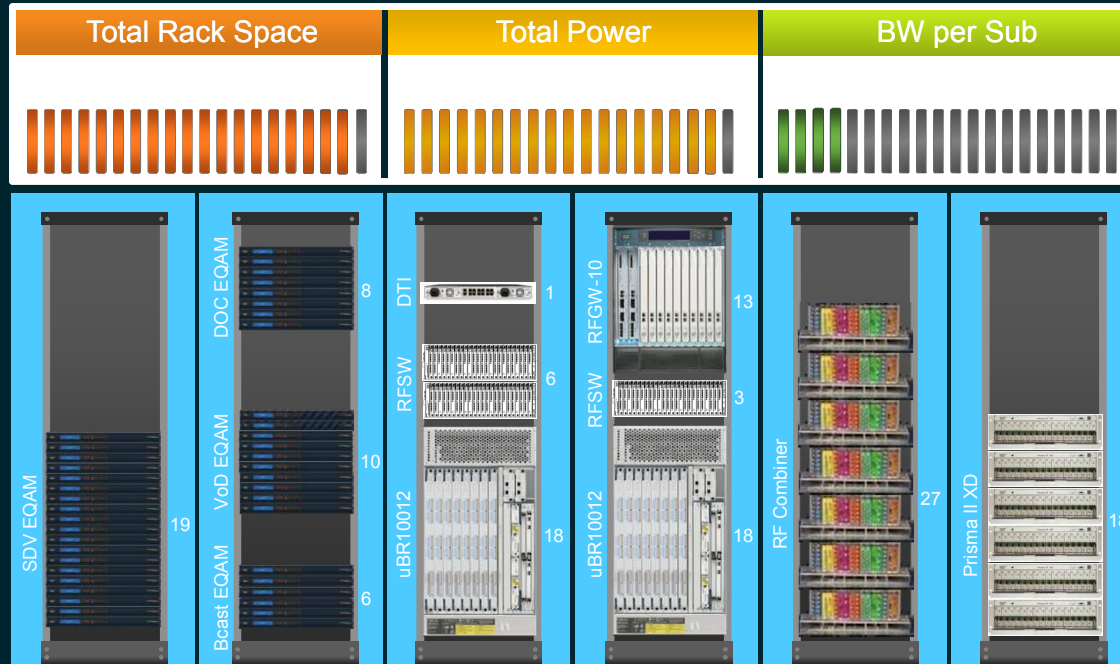
Phase 1 – Reduce OPEX

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1

Step 1: Scale DOCSIS Downstream/SG on a High-density UEQAM

1



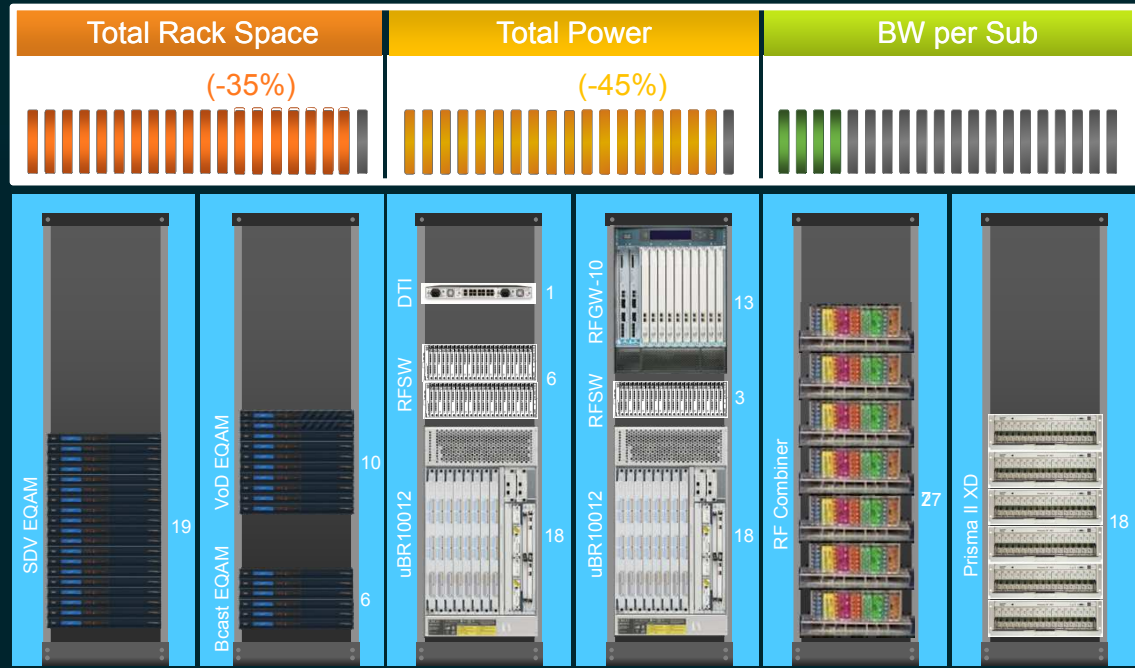
*Note: Calculation is based on 35K HHP / hub and 54 SGs, 1 P...

Add uBR10012 to increase bandwidth per sub

- Establish foundation for modular CCAP with uBR10012 & RFGW-10
- Increase DOCSIS downstream bandwidth-per-sub by 100%

Step 2: Converge VoD & SDV QAMs on a High-Density UEQAM

2

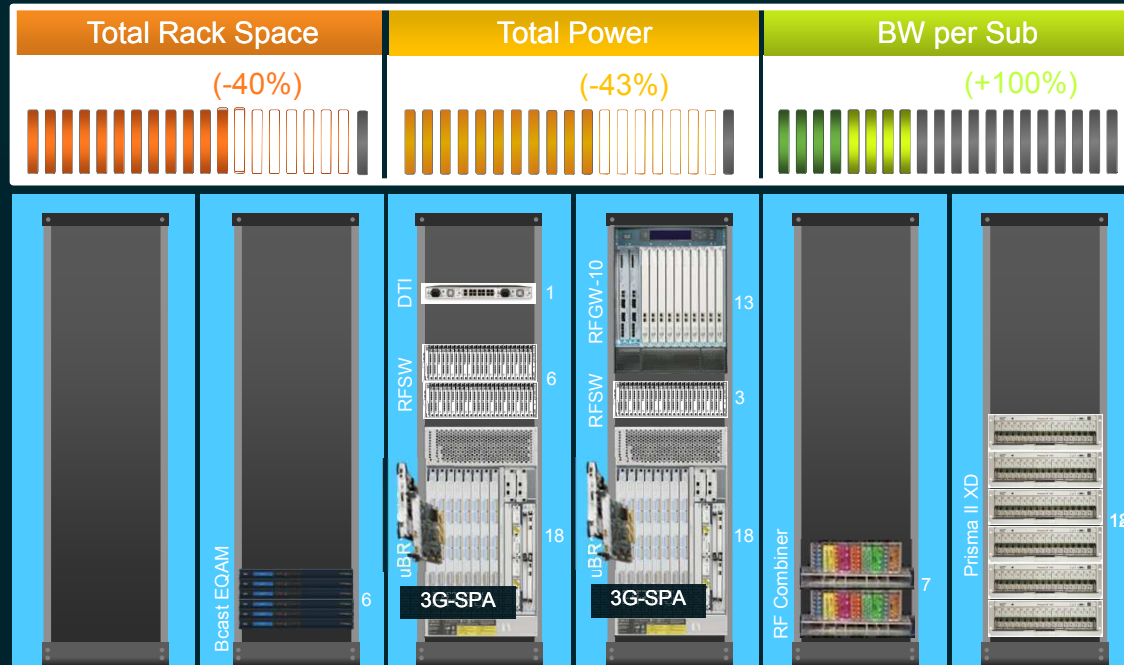


*Note: Calculation is based on 35K HHP / hub and 54 SGs, 1 P...

SDV EQAM migr Reduce number of RF Combiners

- Converge legacy VoD & SDV QAMs into modular CCAP on RFGW-10
- Decrease rack space by 35% and power by 45%

Step 3: Scale CMTS Downstream Capacity



3

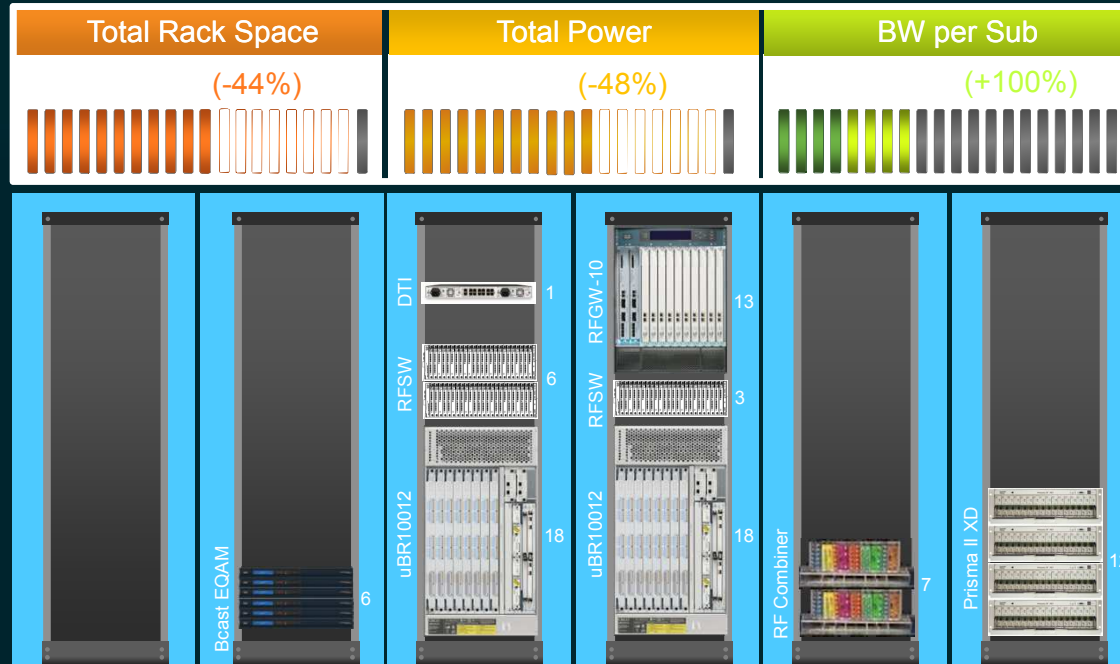
*Note: Calculation is based on 35K HHP / hub and...

Add 3G-SPA to uBR10012

Reduce Prisma II XD

- Double the downstream capacity of uBR10012 with PRE5 & 3G-SPA
- Reduce Prisma rack space by 33% with double-density TX modules

Step 4: Converge Broadcast Video on a High-Density UEQAM

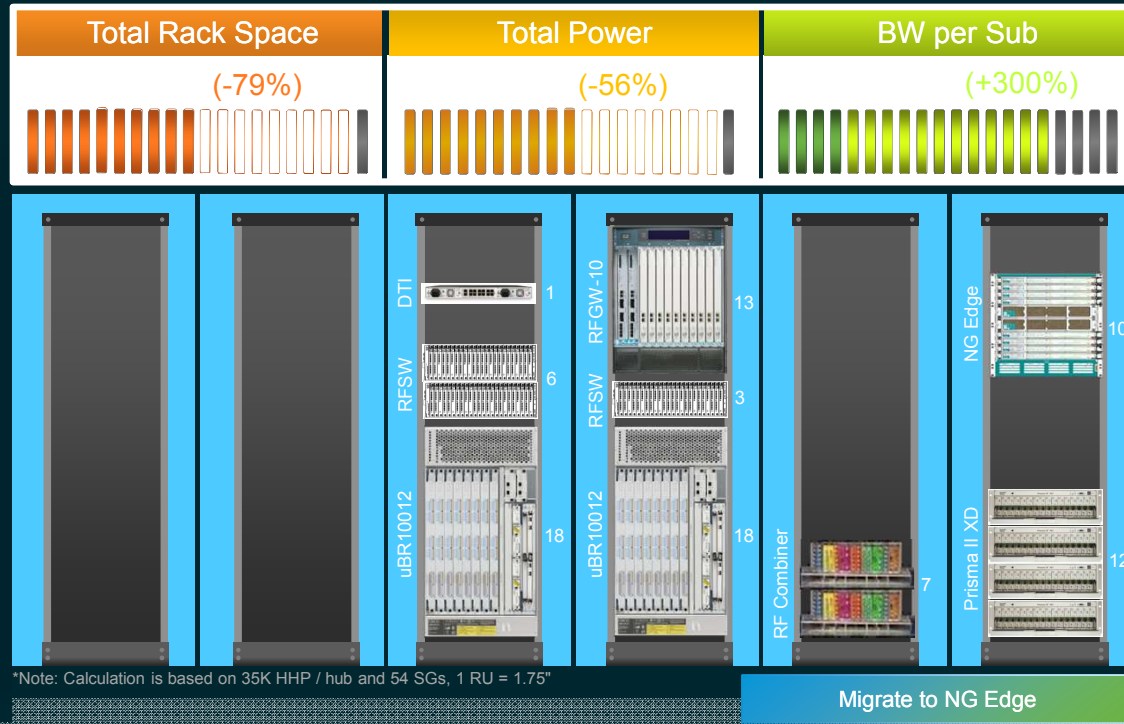


*Note: Calculation is based on 35K

Migrate Bcast EQAM to RFGW-10

- Converge broadcast QAMs into modular CCAP on RFGW-10
- Decrease rack space by 8% and power by 9%

Step 5: Scale DOCSIS to >1 Gbps per SG with NG Edge



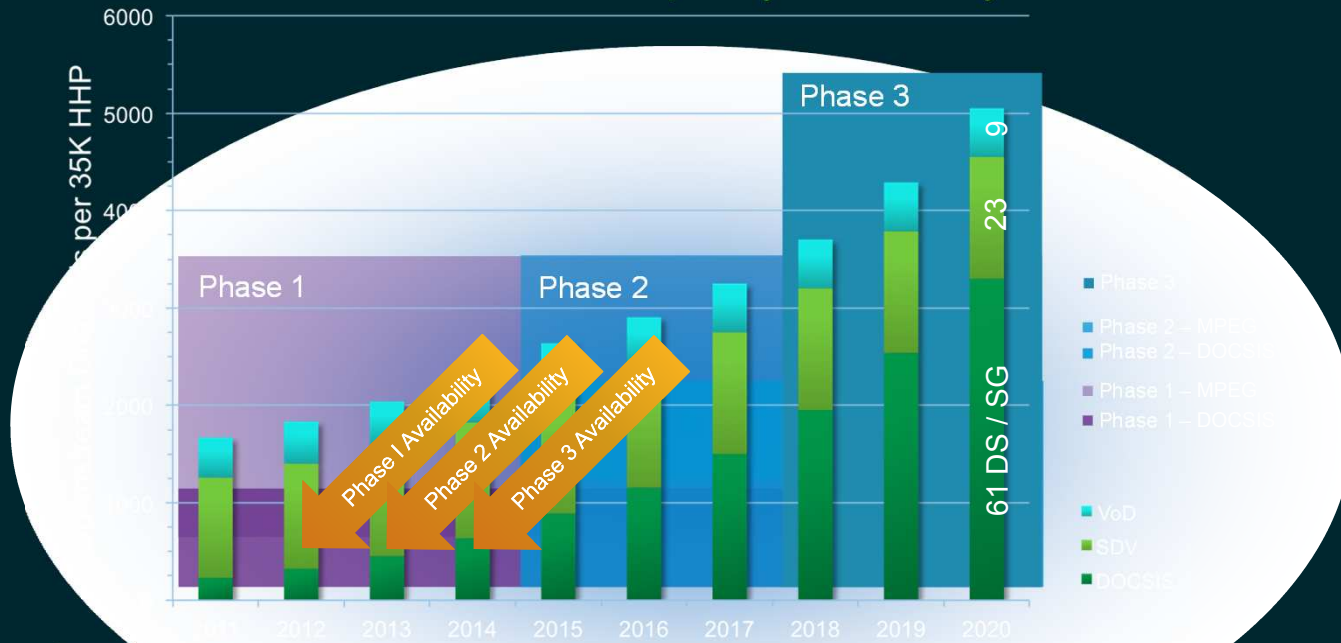
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*Note: Calculation is based on 35K HHP / hub and 54 SGs, 1 RU = 1.75"

- Increase bandwidth-per-sub by another 100%
- Decrease rack space by 63% and power by 16%

Meeting the Bandwidth Growth

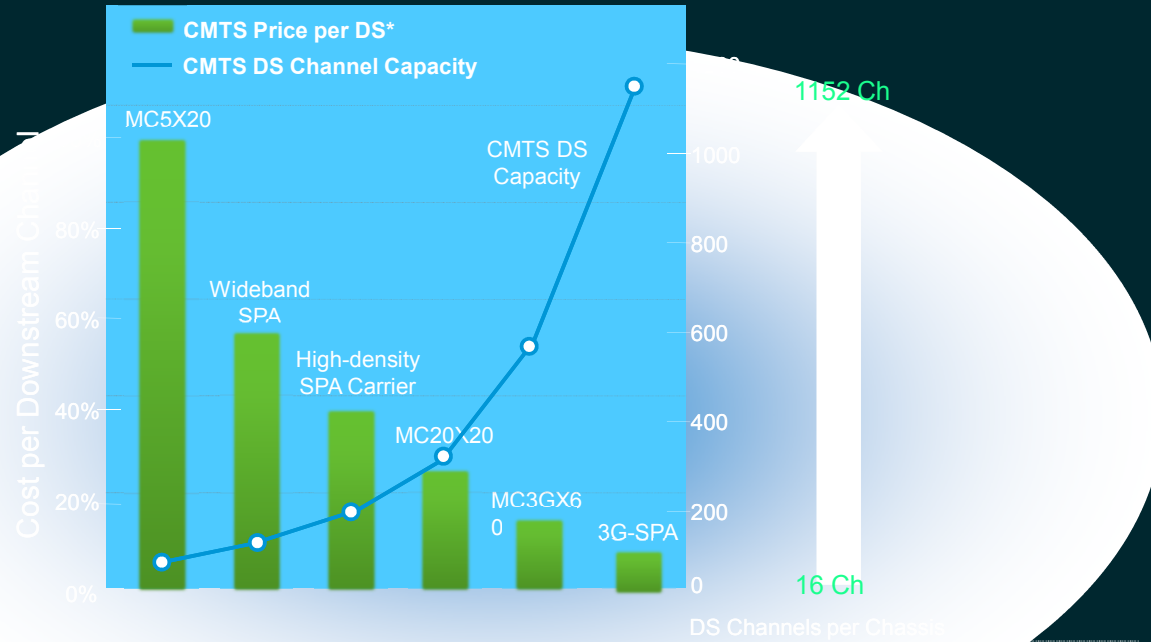
Downstream Channel Demand verse Capacity Availability



- Additional capacity is available well before it's required
- Maximize efficiency and minimize cost by upgrading incrementally, when and where needed

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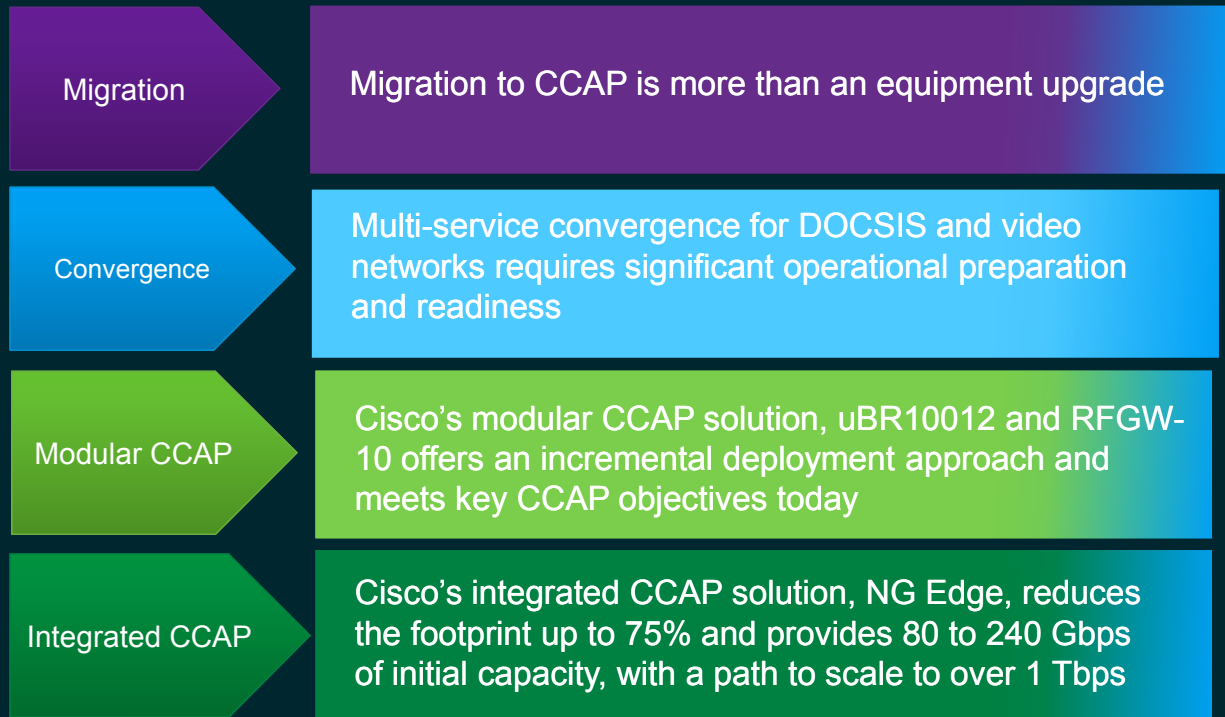
Meeting the Cost Reduction Challenge While Delivering Greater Capacity and Density



- Reduce downstream costs & OPEX while migrating towards an all-IP network
- Maximize efficiency and minimize cost by upgrading incrementally when and where needed

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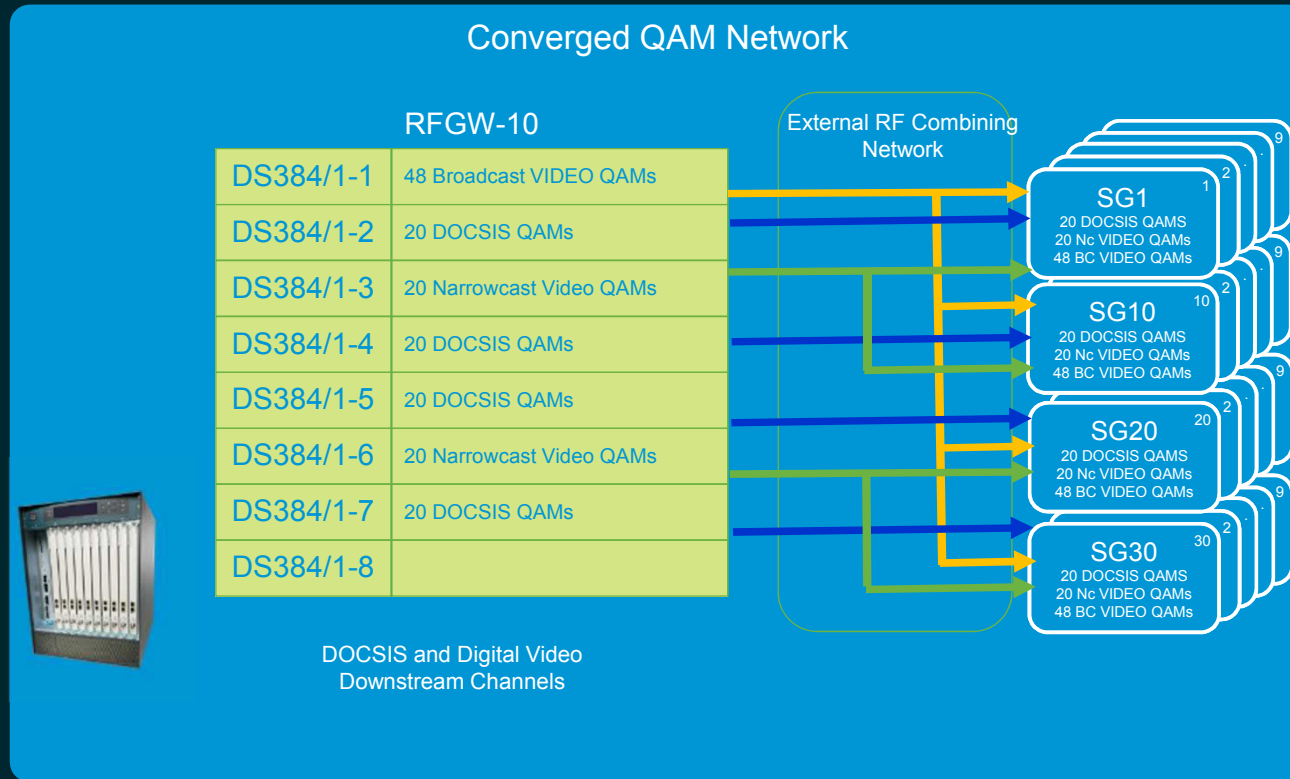
Summary and Conclusions



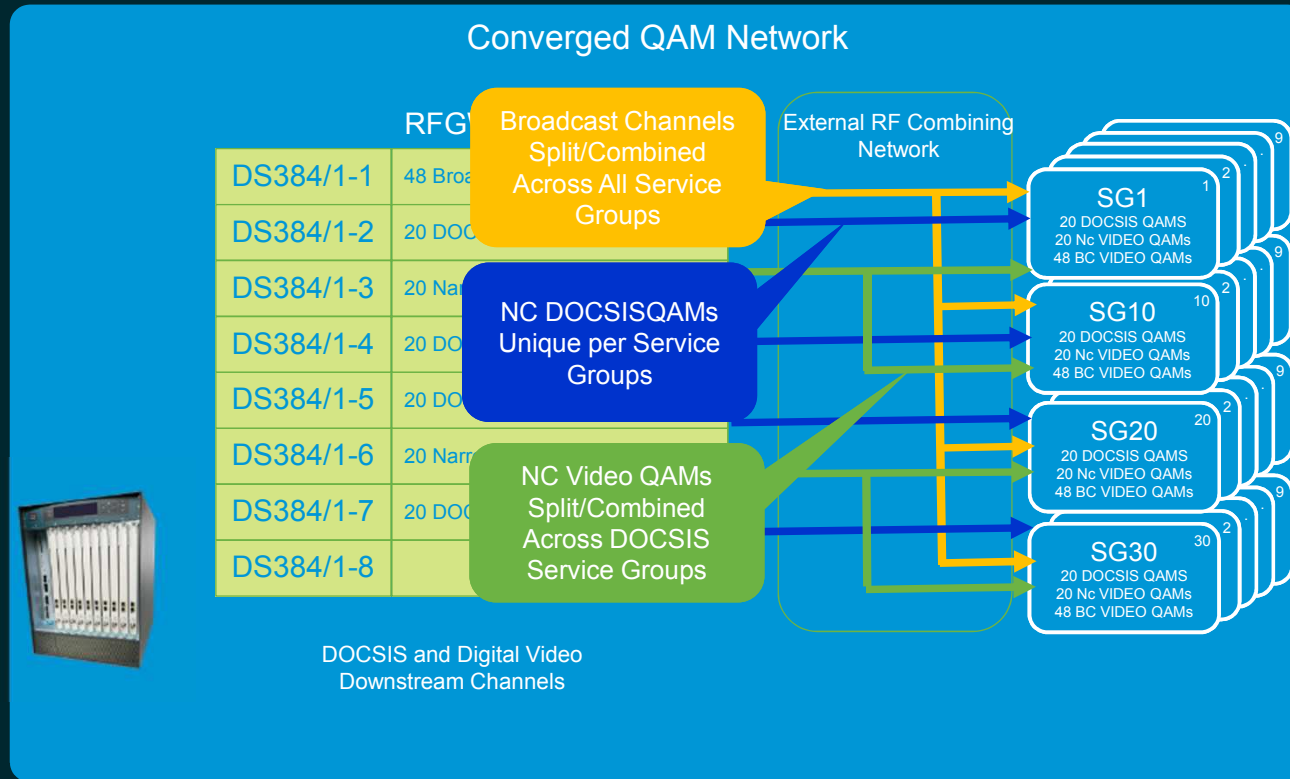
Operational Efficiencies Examples



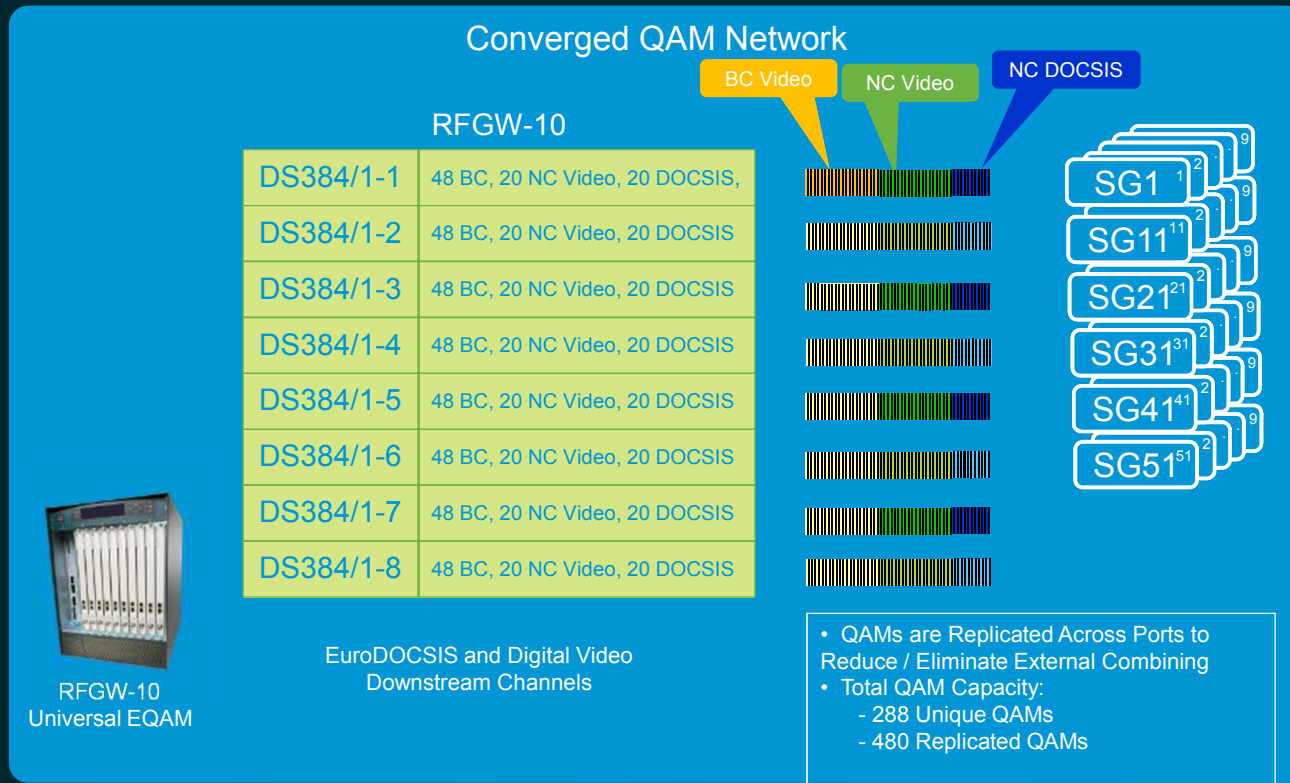
SG Combining – Today's Approach



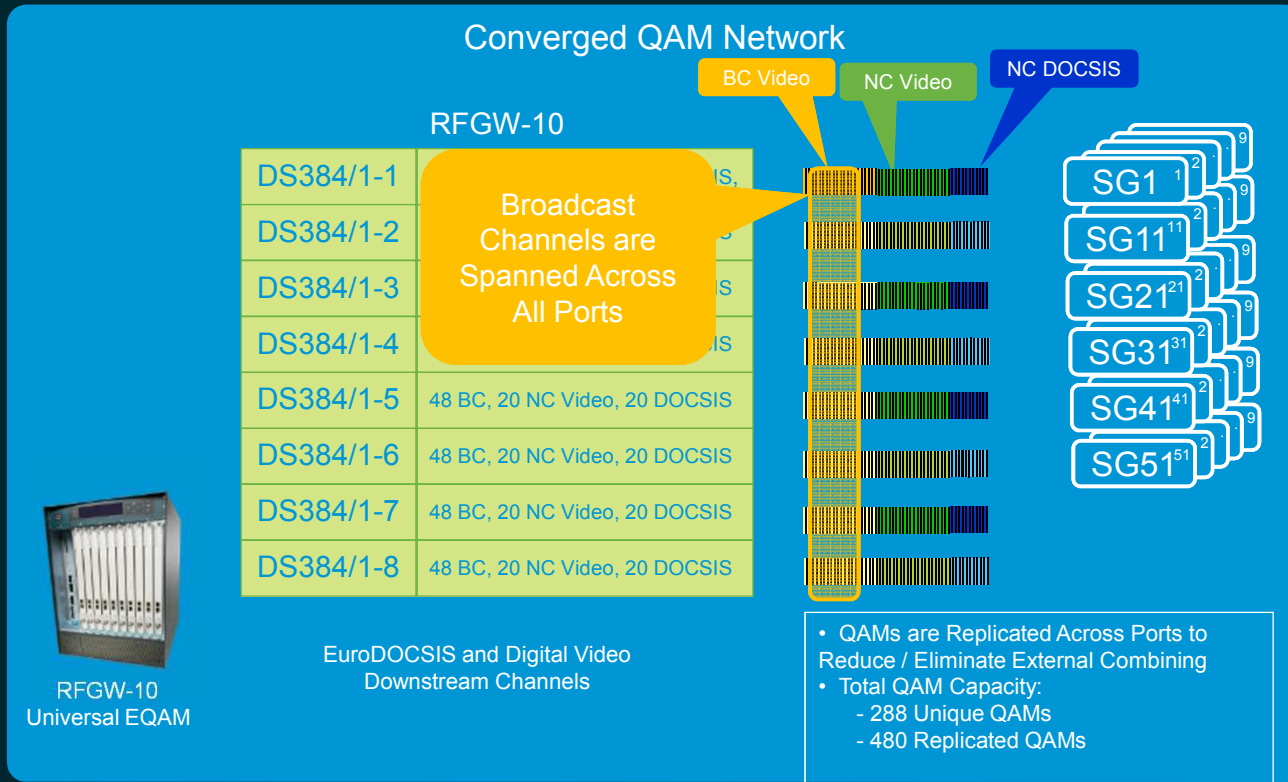
SG Combining – Today's Approach



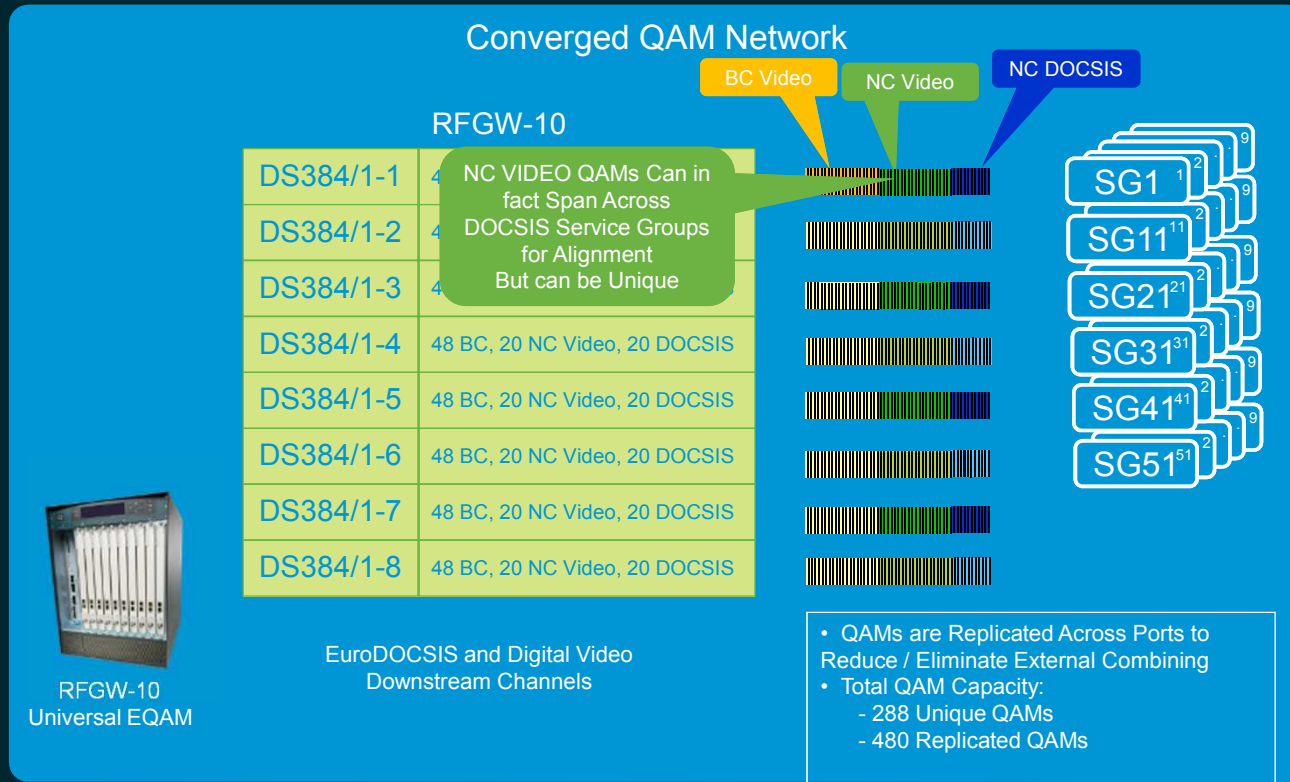
SG Combining Using RF Spanning



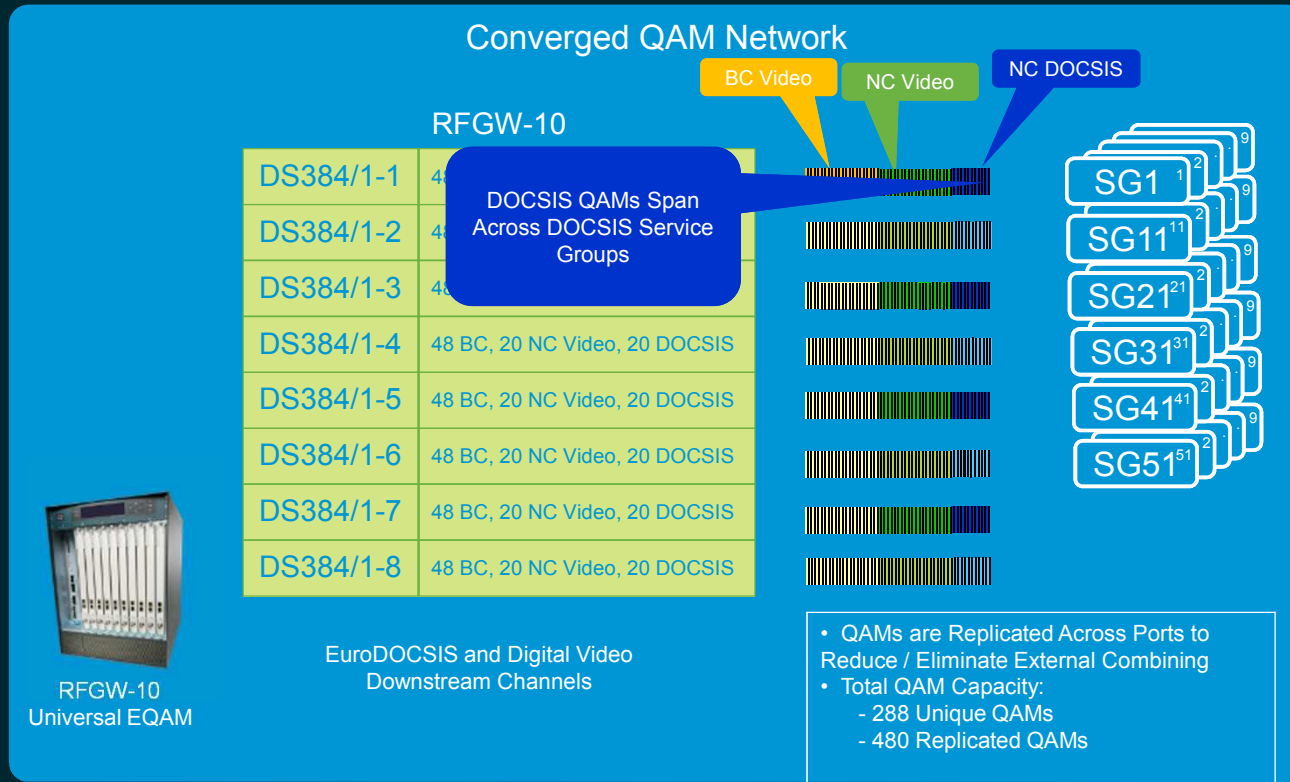
SG Combining Using RF Spanning



SG Combining Using RF Spanning

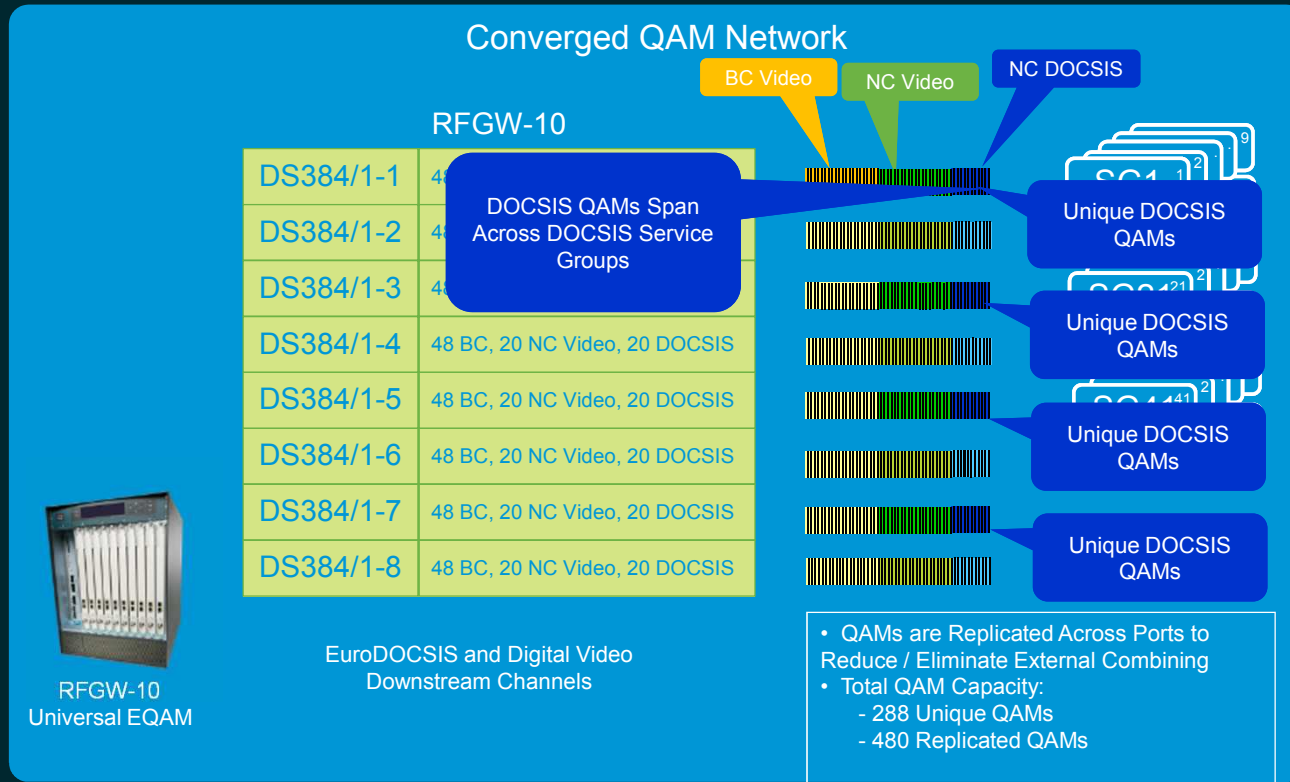


SG Combining Using RF Spanning

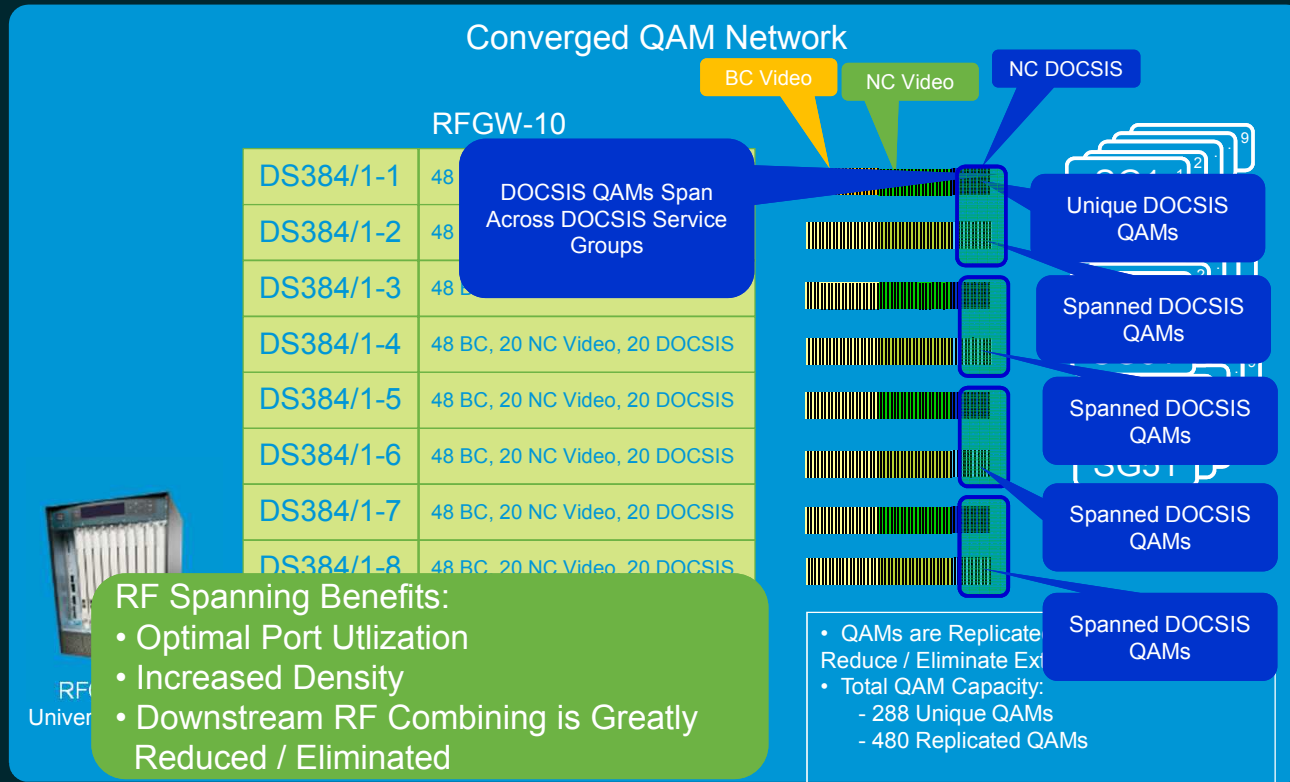


RFGW-10
Universal EQAM

SG Combining Using RF Spanning



SG Combining Using RF Spanning



DOCSIS 3.1 Overview



DOCSIS 3.1 Objectives

DOCSIS 3.1 Goals:

1. Downstream progressing beyond 1Ghz to allow 1G migrating to 10G DS speeds
2. Upstream mid split in the region of 238Mhz to allow 300mb migrating to 2G US speeds
3. Spectrum efficiency gains with the use of OFDM in US and DS
4. LDPC/FEC potential 3db gain giving rise to 1024QAM

The cost/HP to implement DOCSIS 3.1 is less than 1/10 to 1/20 of the cost to implement PON while the services are competitive

Technology Potential of DOCSIS 3.1

	DOCSIS 3.0		DOCSIS 3.1	
	Now	Phase 1	Phase 2	Phase 3
DS Range (MHz)	54 - 1002	108 - 1002	<u>300</u> - 1152	<u>500</u> - 1700
DS QAM Level	256	256	≥ 1024	≥ 1024
# DS Channels	8	24	<u>"142"</u>	<u>"200"</u>
DS Capacity (bps)	300M	1G	<u>7G</u>	<u>10G</u>
US Range (MHz)	5 - 42	5 - 85	5 - <u>230</u>	5 - <u>400</u>
US QAM Level	64	64	≥ 256	≥ 1024
# US Channels	4	12	<u>"33"</u>	<u>"60"</u>
US Capacity (bps)	100M	300M	<u>1G</u>	<u>2.5G</u>

Note: TBD values are underlined, Channels in quotes = Equivalent # of SC-QAMs

In Summary

- CCAP objectives provide the roadmap to:
 - Convergence of Voice, Video and Data onto a single platform
 - Unprecedented densities to eliminate rack space, power and cooling
 - Continued reduction in \$/DS for unprecedented growth in narrowcast services
- RF Spanning allows optimal QAM utilization and minimizes RF combining
- DOCSIS 3.1 is the most cost effective way to provide competitive data and IP Video services

Disclaimer

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