PRE5 and 3G-SPA

Increasing DOCSIS Capacity for CCAP

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Cisco Knowledge Network

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If you would like to get in touch with our technical experts or provide your feedback, please email us at globalckn@cisco.com.

Thank you.

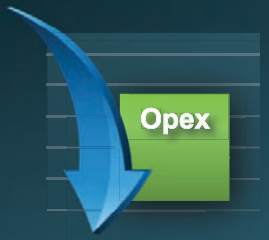
Agenda

- Cisco CCAP Strategy
- PRE5 Overview
- 3G-SPA Overview
- Licensing
- Deployment scenarios
- Q&A

Cisco CCAP Strategy

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

5 Scale DOCSIS to to >1 Gbps per SG with a compact, high-density chassis

Massively scale the bandwidth, plus reduce rack space and power with the Cisco cBR-8

Phase 2 – Maximize the ROI

4 Converge broadcast video on a high-density UEQAM

3 Scale CMTS downstream capacity

With uBR10012 chassis, PRE5 and 3G-SPA, double the DS bandwidth with no additional rack space required

Phase 1 – Reduce the OPEX

2 Converge VoD and SDV on a high-density UEQAM

1 Scale DOCSIS downstream per SG on a high-density UEQAM

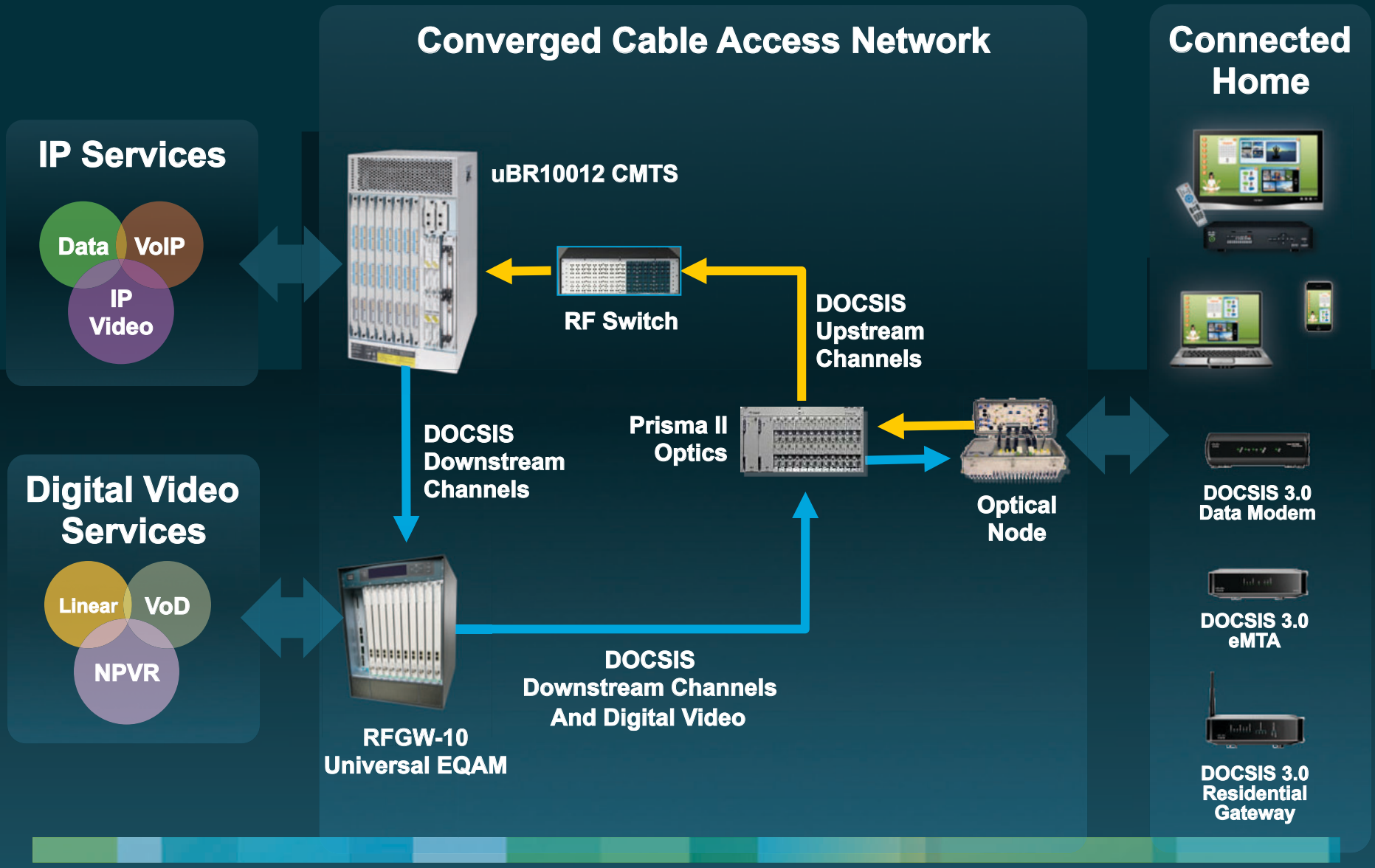
More than 35% savings in rack space & 45% less power with RFGW-10 & DS384

Cisco CCAP Strategy Key Take aways

Migration	Migration to CCAP is more than an equipment upgrade
Convergence	Multi-service convergence for DOCSIS and video networks requires significant operational preparation and readiness
Modular CCAP	Cisco's modular CCAP solution, uBR10012 and RFGW-10 offers an incremental deployment approach and meets key CCAP objectives today
Integrated CCAP	Cisco's integrated CCAP solution dramatically reduces the footprint and provides the scalability needed to support the next decade of growth in IP services

PRE5 and 3G-SPA Overview

Cisco Multi-Service Cable Solution



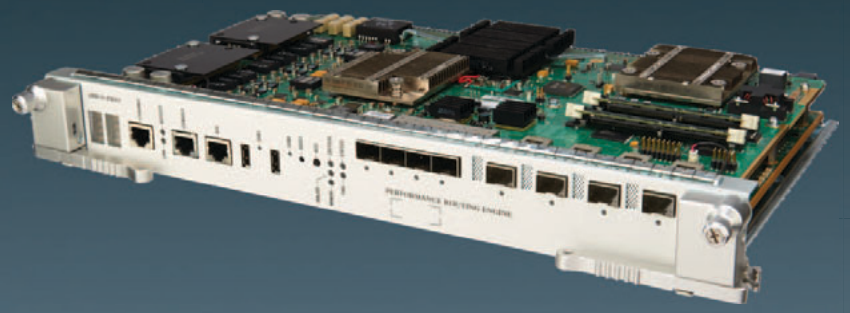
uBR10012 DOCSIS (EuroDOCSIS) CMTS

- Most widely deployed CMTS chassis
- Mature, feature rich software base
- Carrier Class
- Up to 576 DOCSIS DS* and 480 US channels per chassis in today's configuration
- DOCSIS® 3.0 and EuroDOCSIS® 3.0
- Additional 576 DOCSIS downstreams* *coming soon*

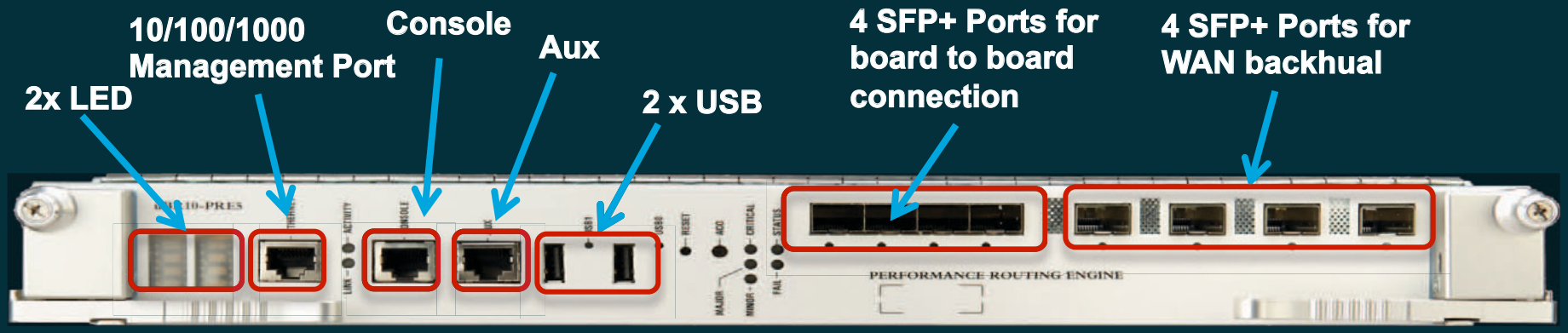
*Annex B☐

Routing Engine Enhancements
PRE5 Overview

- **PRE5 enables up to 40 Gbps of WAN backhaul**
  - **4x10GE WAN backhaul ports**
  - **10Mpps for both IPv4 and IPv6 with commonly used features**
- **WAN backhaul ports on PRE5 free up SPA slots**
  - **8 x 3G60 + 8 x 3G-SPA in single chassis**
  - **Increases capacity of uBR10K to 1152 DOCSIS DS channels**
  - **Enables deploying 16-24+ DOCSIS channels per SG at scale**



PRE5 Front Panel Overview



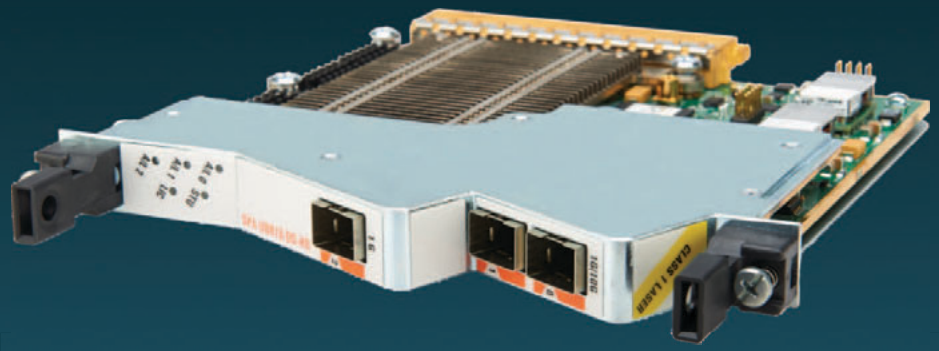
- Four SFP+ ports for WAN backhaul capability
- Four SFP+ ports for board to board connection enable active PRE to control remote backhaul interfaces on standby PRE5
- 2x USB ports used for USB disks, to store Cisco IOS image or a system configuration file . The system can also boot from the software stored on the USB disk
- LED will display the IOS system status and license information

Key Features

Key Features	Benefits
Up to 60 Gbps aggregate throughput	*Upstream + downstream forwarding for fully loaded system*
Up to 10M PPS system performance	*High performance packet forwarding engine*
Integrated WAN backhaul	*Free up more SPA slots for downstream capacity increase*
Redundant, load sharing WAN support	*High availability, temporarily absorb 80G burst traffic*
Improved IPv6 performance	*Equivalent IPv4 and IPv6 performance*
Software license support	*Pay-as-you-grow model to control capex*
4G internal and 4G external eUSB flash	*Larger and faster disk to replace the compact flash*

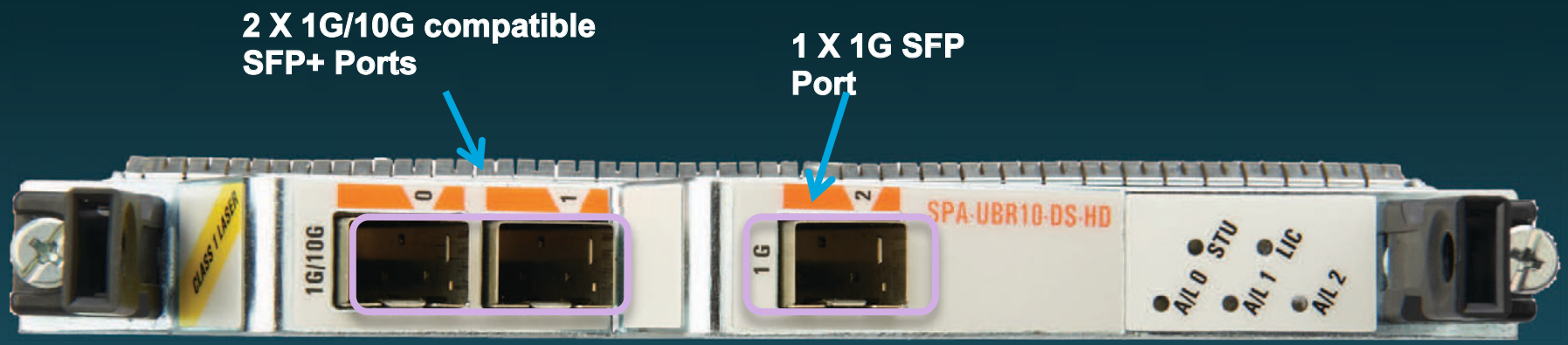
3G SPA Overview

- Double the downstream capacity of uBR10K
- 3G-SPA has functional parity with current Wideband SPA
  - 72 downstream channels hosted by 3 controllers (Annex B)
  - 54 downstream channels hosted by 3 controllers (Annex A)
  - 4 x 3G-SPA per SIP-600 card (Jacket card)
  - Cable modems can use the DS channels from 3G-SPA and US channels from 3G60
- Hardware features
  - 2 SFP+ ports & 1 SFP port on front panel; SFP+ ports can be used as SFP port
  - 2 SFP+ ports can be configured for 1+1 redundancy



3G SPA Other Key Features

- Low power consumption: 30W
- Flexible pay-as-you-grow model with software licensing
- Supported with PRE5 only
- Up to 96 bonding groups (wideband interfaces)
- Bonding across controllers
  - Efficient 16 channel bonding
  - Supports >24 channel bonding



uBR10012 with 3G-SPA

Doubles the DS Channel Capacity

- M-CMTS design of 3G-SPA allows flexibility in deploying additional DS capacity and avoids stranding capacity
- Add DS capacity to existing service groups with no change to RF combining network

Downstream Channel Capacity per uBR10012

	3G60			3G-SPA			CMTS	
	3G60 per CMTS	Total 3G60 Capacity (Gbps)	Total 3G60 Capacity (DS)	3G-SPA per CMTS	Total 3G-SPA Capacity (Gbps)	Total 3G-SPA Capacity (DS)	Total CMTS Capacity (Gbps)	Total CMTS Capacity (DS)
With LCHA	7	21	504	8	24	576	45	1080
Without LCHA	8	24	576	8	24	576	48	1152

Licensing

PRE5 Software License Support

- PRE5 software licensing is on per WAN SFP+ port basis
  - licensable resource is the 10GE port
- LED on the front pane will display the license count: 40G, 30G, etc.
- License options:

  PRE5 10G : 1 active WAN SFP+ 10G port, minimum orderable configuration, Mfg pre-installed license

  PRE5 20G: 2 active WAN SFP+ 10G ports

  PRE5 30G: 3 active WAN SFP+ 10G ports

  PRE5 40G: 4 active WAN SFP+ 10G ports

  L-PRE5-10G: 1 count 10G license for PRE5, customers can purchase multiple 1 count 10G licenses under one PAK container

Audience Poll

How many 10G WAN ports will you initially activate on each PRE5?

A. 1

B. 2

C. 3

D. 4

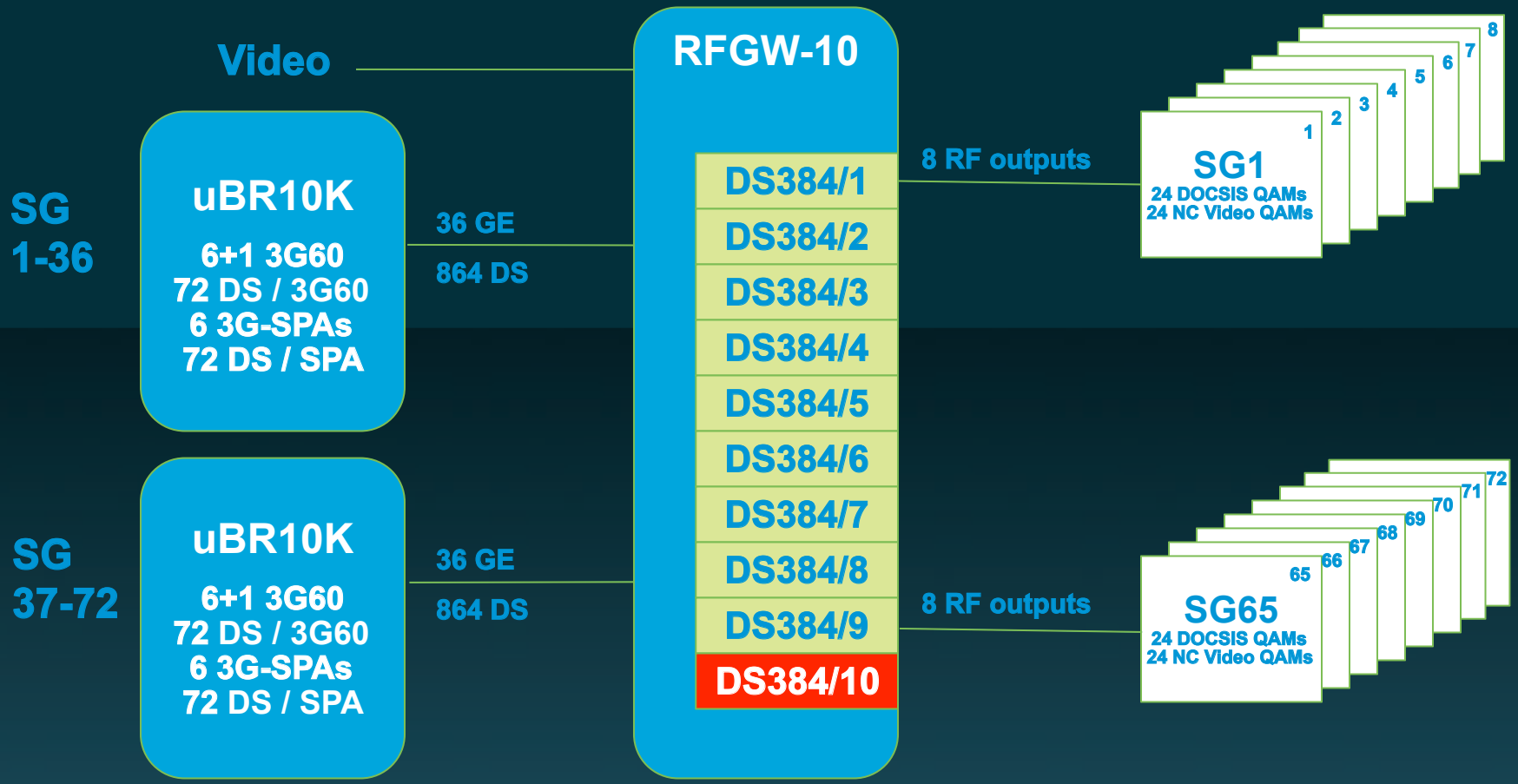
3G-SPA License Support

- Each 3G-SPA will have its own software license installed
- The license is on a downstream channel basis - max 72
- 3G-SPA license administration and management follows the same approach as 3G60
- A specific number of DS channels are licensed, i.e. license controls DS channel count but not the specific DS channels
- 3G-SPA LED indicates license level

Deploying PRE5 and 3G-SPA

Plan Today for 1Gbps of DOCSIS per SG

PRE5, 3G60/DS384 with N+1, and 3G-SPAs



24 DS Peak Rate Scenario with RF Spanning

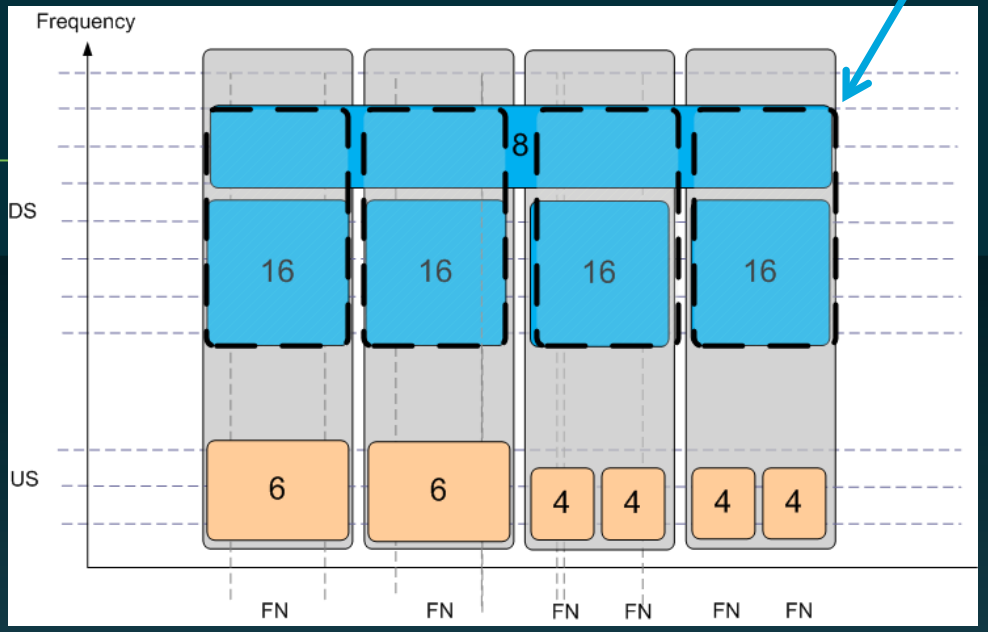
16 NC + 8 Spanned, PRE5, 3G60+3G-SPA

uBR10K

8 3G60
72 DS / 3G60
8 3G-SPAs
72 DS / SPA

48 GE

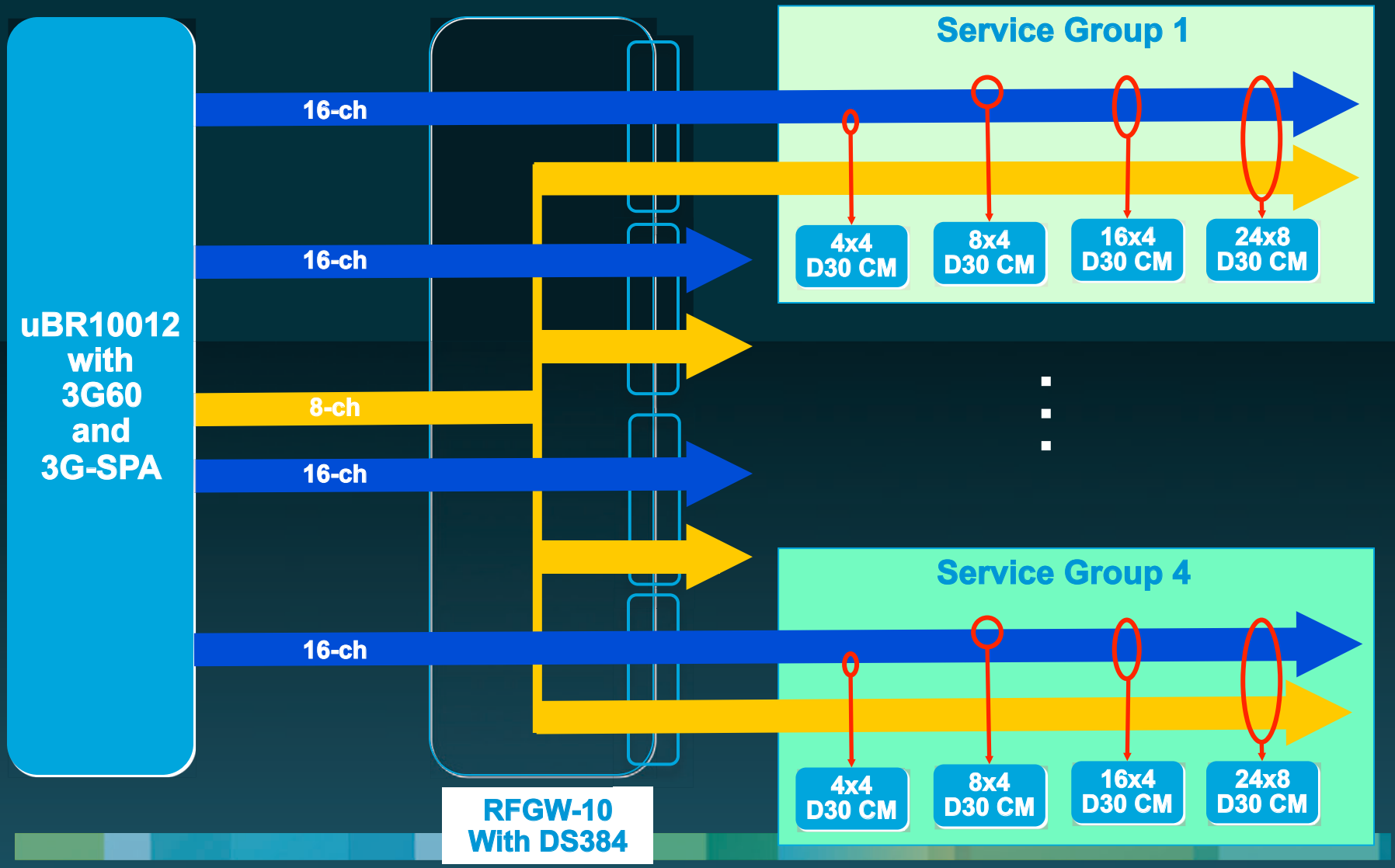
1152 DS



- 64 Downstream Service Groups
- 56 Downstream Service Groups with 3G60 N+1

Provide higher peak rate to more service groups with RF spanning

DOCSIS Unicast RF Spanning and QAM replication 24x8 CMs in DOCSIS Networks



Audience Poll

When do you expect to need 24 or more DOCSIS downstream channels per service group?

A. 2013
B. 2014
C. 2015
D. 2016
E. Beyond 2016

Summary

PRE5 and 3G-SPA Summary

- **Doubles** the downstream capacity of the existing platform
- **Scalability** to meet rapid growth in IP video and HSD services
- Incremental upgrade results in **Opex and Capex savings**
- High-density solution **reduces cost per bit** for all services
- Completes Phase 2 of Cisco's **phased CCAP** approach, meeting the key CCAP objectives and enabling a manageable migration execution strategy

Q&A

Thank you.