Delivering Gigabit Speed with Existing uBR10012 CMTS and New 6G-SPA Capability

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Business Priorities For The MSOs' Data Businesses

Increase Revenue

Drive Operational Speed & Efficiency

Stay Ahead of Competition

Google fiber at&t verizon FiOS

Deliver more attractive services faster

- Business services – more complex & more demanding
- Consumers - Make customers lives simpler and richer
- Business agility & service velocity whilst reducing costs

Applications

Rapid Creation & Deployment

Orchestrate, Automate, Simplify

- Speed – reduce provisioning intervals to hours or days – "devops for the network"
- "Cross-domain" management fast and error free for business services and more
- From managing configurations to managing services

Orchestration

Automation, SDN, NFV and Policy

Deliver More - with Less

- Deliver faster internet tiers, year over year
- 10X bandwidth growth over 5 years challenges space, power & TCO

Infrastructure

Physical and Virtual Resources

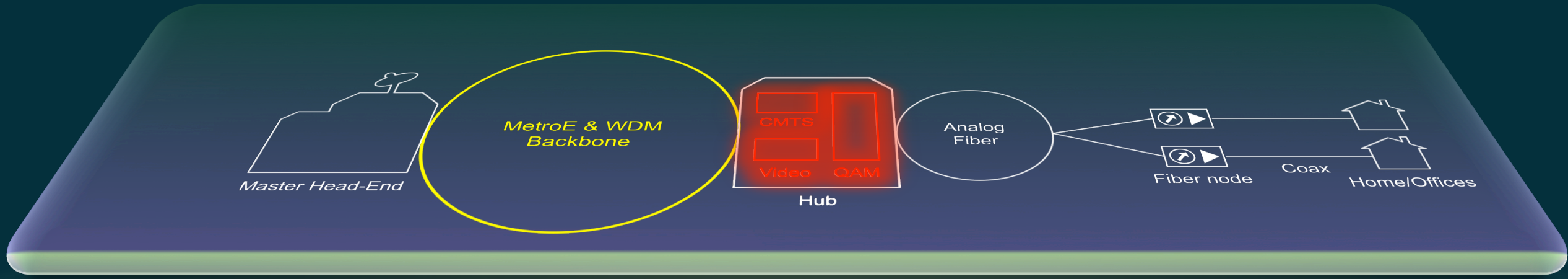
Cisco is focused on addressing MSO priorities

- Current Platforms
  - Continue to scale to deliver faster services
  - Achieve key CCAP objectives with existing infrastructure
- Next Generation CCAP Platform
  - Lead with highest density, highest capacity
  - DOCSIS 3.1, full spectrum IP and/or MPEG Video Services
  - Path to virtualization
- Next Generation End-to-End Access Solutions
  - Fiber Deep, All-IP Content delivery
  - Remote PHY with Digital Fiber
- SDN – Quickly add capabilities beyond the feature rich CCAP Core
- NFV – Moving network functions into virtual environments

Today's Session: Leverage Existing Cable Access Infrastructure

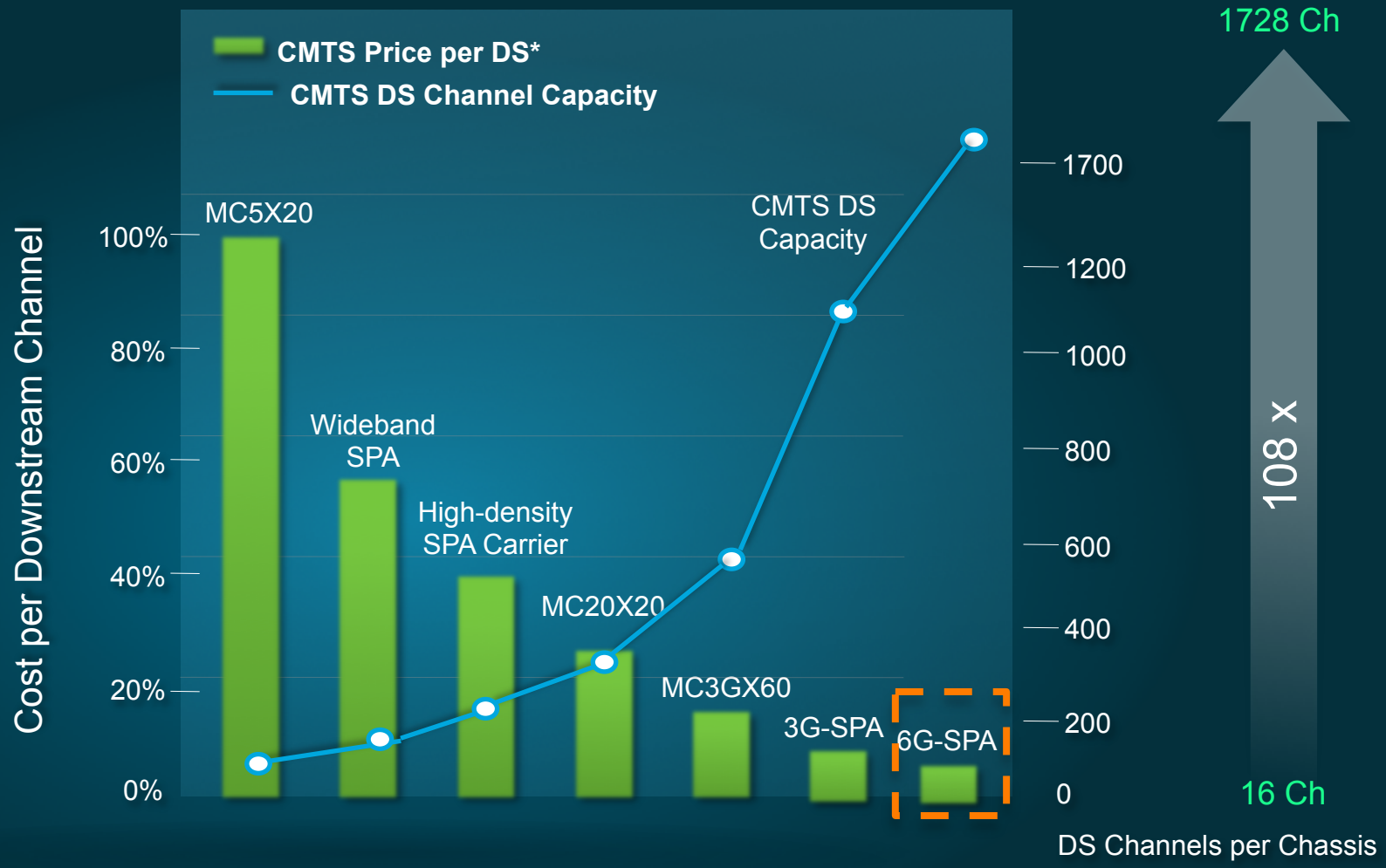
Deliver Gigabit Capacity Across uBR10K Footprint

- 1Gbps Speed with 32 channel modems
  - Broad, cost effective, rapid deployment feasible
- Converge Narrowcast Video & Data
  - Reduce rack space, power & cooling



Delivering Greater Capacity and Density

While meeting the cost reduction challenge



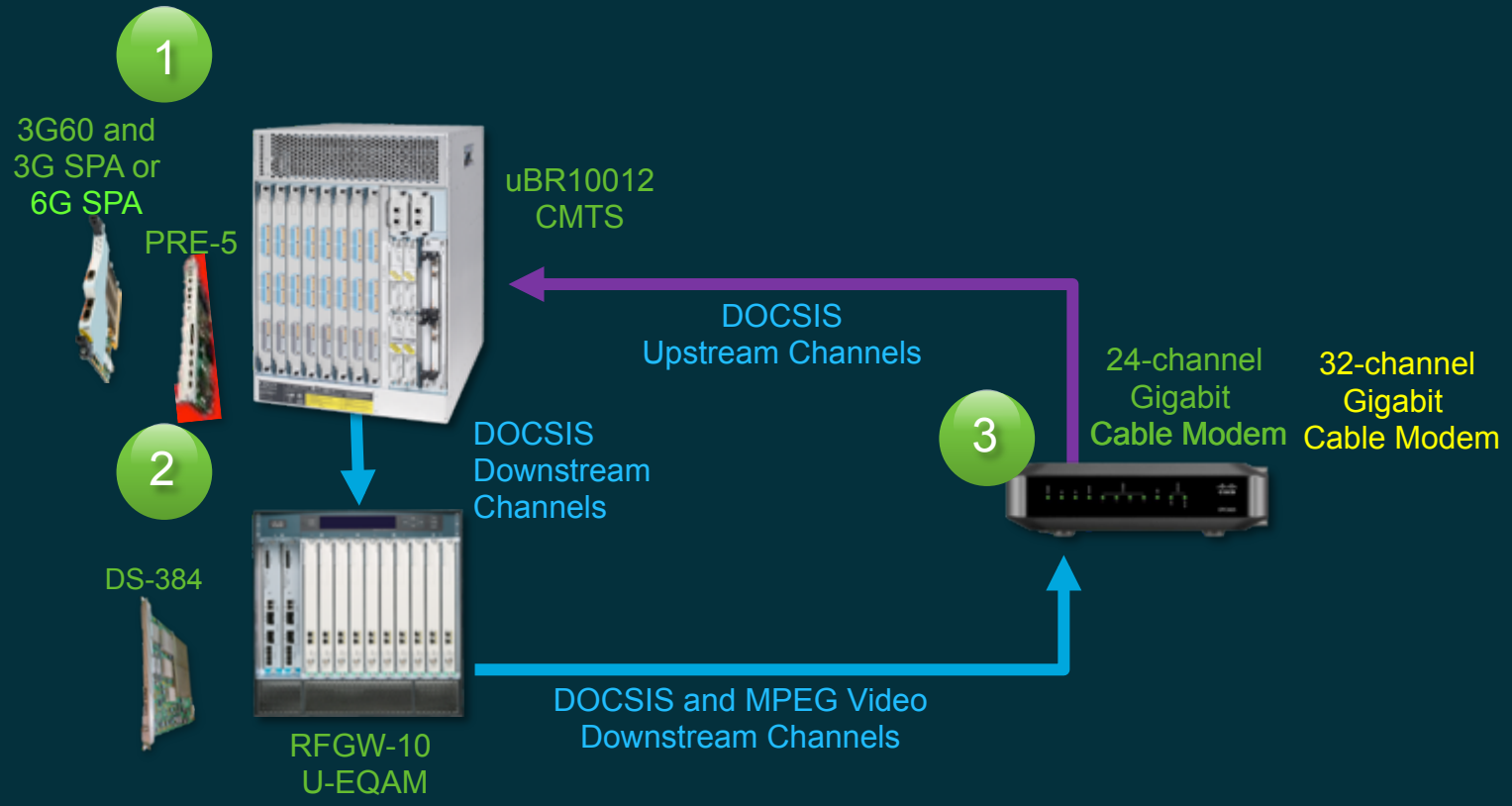
- Cisco has consistently reduced downstream costs and increased capacity

Leverage Gigabit DOCSIS infrastructure while migrating to CCAP

1. **uBR10012**
with 3G60 and 6G-SPA and PRE-5 modules for scalable Gigabit CMTS and Video over DOCSIS services

2. **RFGW-10**
with DS-384 line cards for Video Convergence, QAM Replication

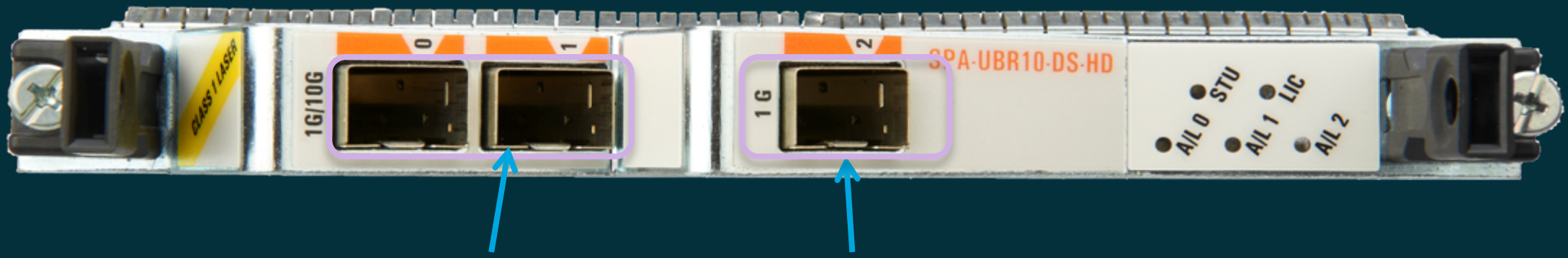
3. **24-channel Gigabit Cable Modem**
for Gigabit DOCSIS and IP Video services



32-channel cable modems are on the horizon

3G-SPA Review

- Full DOCSIS 3.0 & M-CMTS Features
- Doubles uBR10K capacity to 1152 DOCSIS DS channels
  - 72 Downstream Channels (Annex B) per SPA with up to 8 SPAs per uBR10k
- M-CMTS flexibility minimizes chance of stranding channel capacity
- Flexible pay-as-you-grow channel licensing
- Hardware features
  - Supports 10 + 10 GE redundant link connectivity or 3 x 1 GE non-redundant link connectivity



2 1G/10G compatible SFP+ Ports

1 1G SFP Port

DOCSIS SPA Expansion: 3Gbps to 6Gbps

- 6G-SPA doubles DOCSIS SPA capacity from 3G to 6G
- Enables 72 Gbps of DOCSIS DS connectivity (1,728 Annex B channels) in single uBR10K
- Software-only upgrade to existing 3G-SPA hardware
- No new hardware
- Available now!

6G-SPA Key Functionality

- RF channel, controller, WB interfaces and DEPI tunnel counts are doubled
  - Controller: 3 -> 6
  - RF channels: 72 ->144 (Annex B) 60 ->120 (Annex A)
  - WB interfaces: 96 ->192 DEPI tunnels: 18 -> 36

- Supported in 12.2(33) SCI release
  - Field Programmable Device (FPD) image is packaged with the release
  - Operator initiates upgrade from 3G to 6G-SPA, if desired
  - 3G-SPA is supported with SCI

System Design Considerations

- 6G-SPA requires use of 10GE interface
- 6 controllers (or 144 rf channels) are divided into 2 groups
  - Each has 3 controllers (0-2, 3-5)
  - Can bond across controllers in the same group
    - For example: WB interfaces on controller 0-2 must include rf channels from controller 0-2
- With the 6G-SPA the DOCSIS capacity can be configured higher than total 10k system capacity
  - Typical for access networks
  - Very similar to original PRE4 / 3G60 deployments

Poll Question

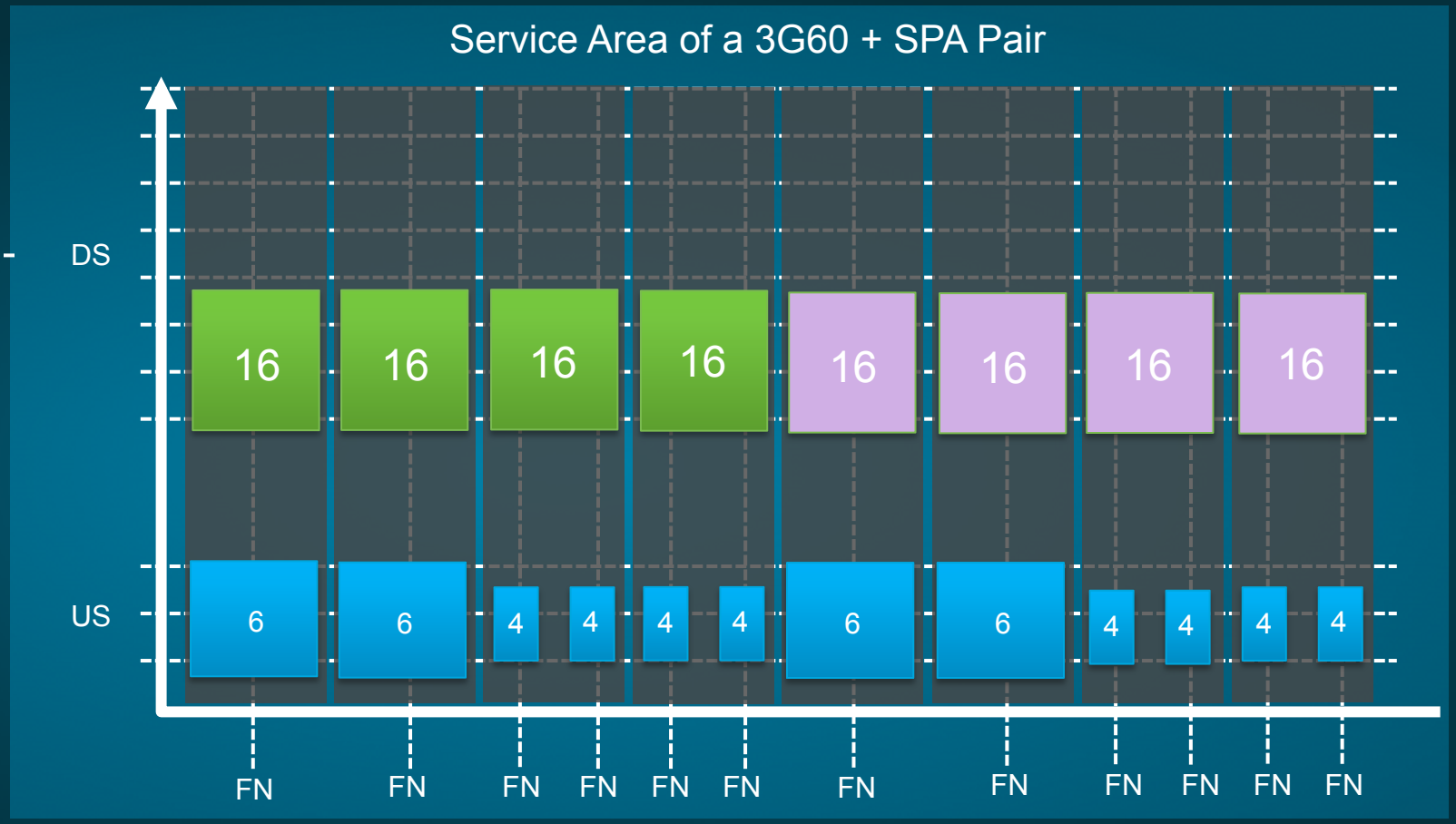
Providing 16 DS per SG Today?

3G60+3GSPA

uBR10K

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

1024 DS



- 64 Downstream Service Groups

3G60

3G-SPA

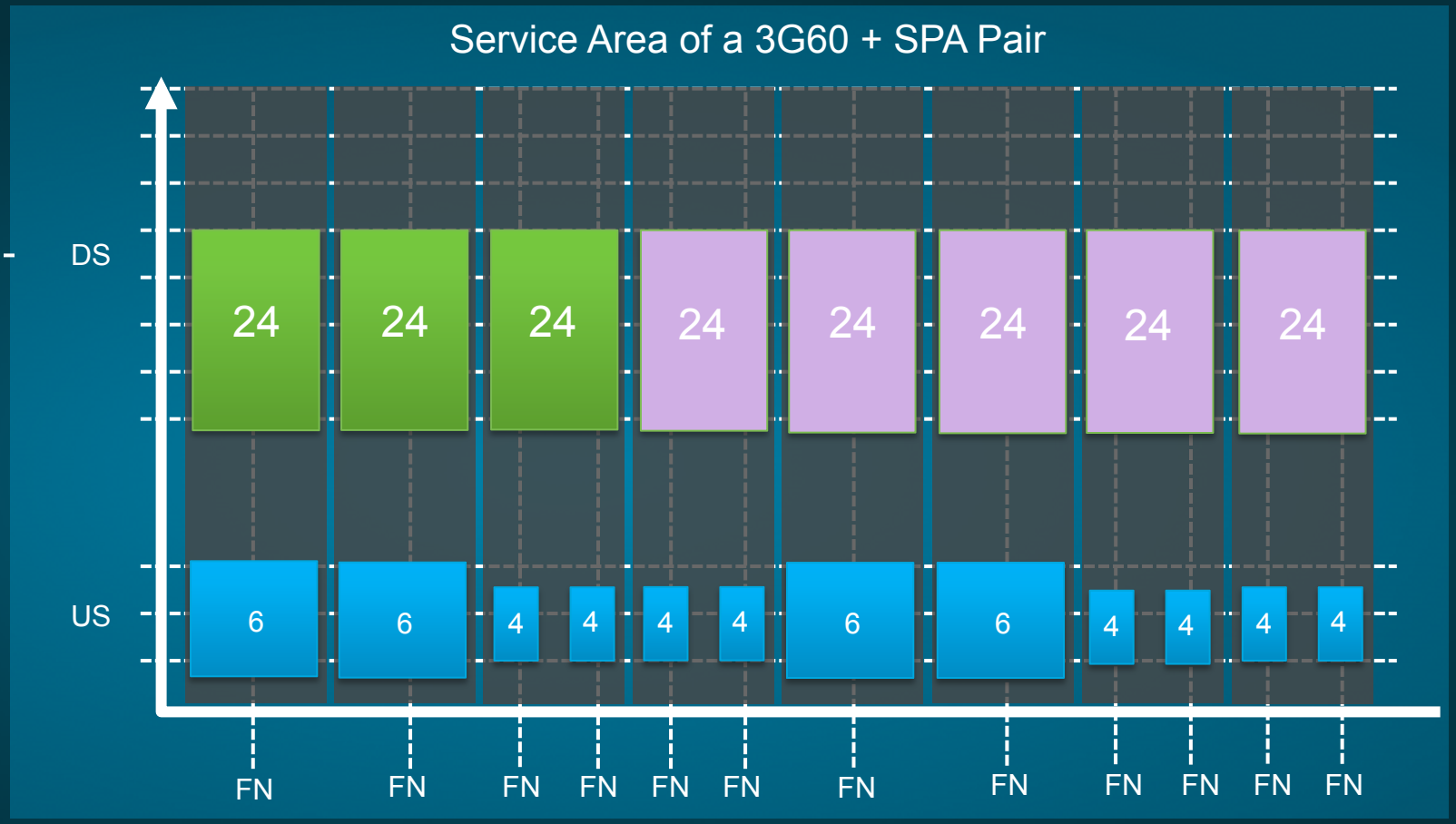
Provide 24 DS per SG with 6G-SPA

3G60+6GSPA

uBR10K

8 3G60
72 DS / 3G60
8 6G-SPAs
120-144 DS / SPA

1536 DS



- 64 -72 Downstream Service Groups

3G60

3G-SPA

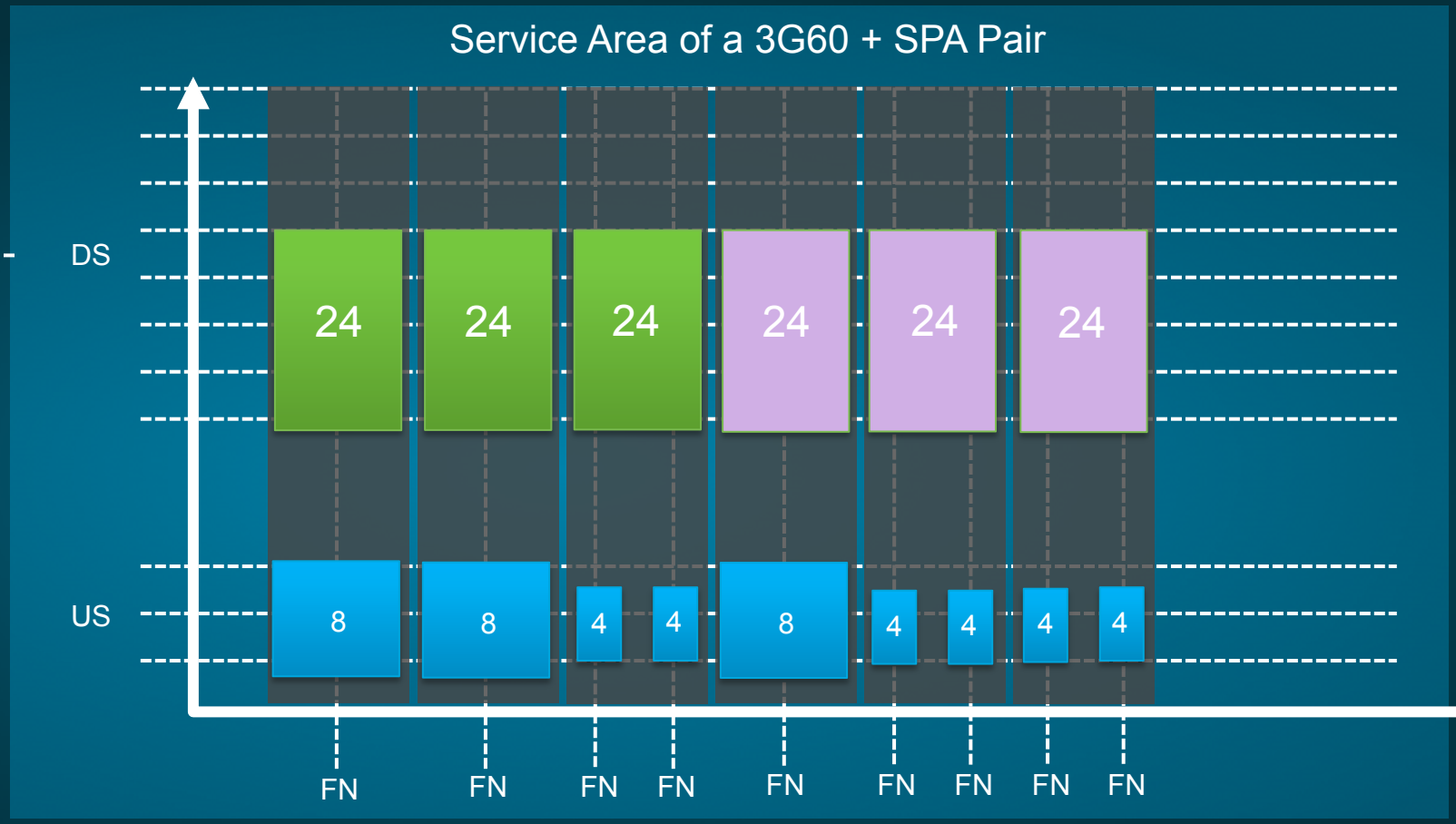
Providing 24 DS per SG Today?

3G60+3GSPA

uBR10K

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

1152 DS



- 48 Downstream Service Groups

3G60

3G-SPA

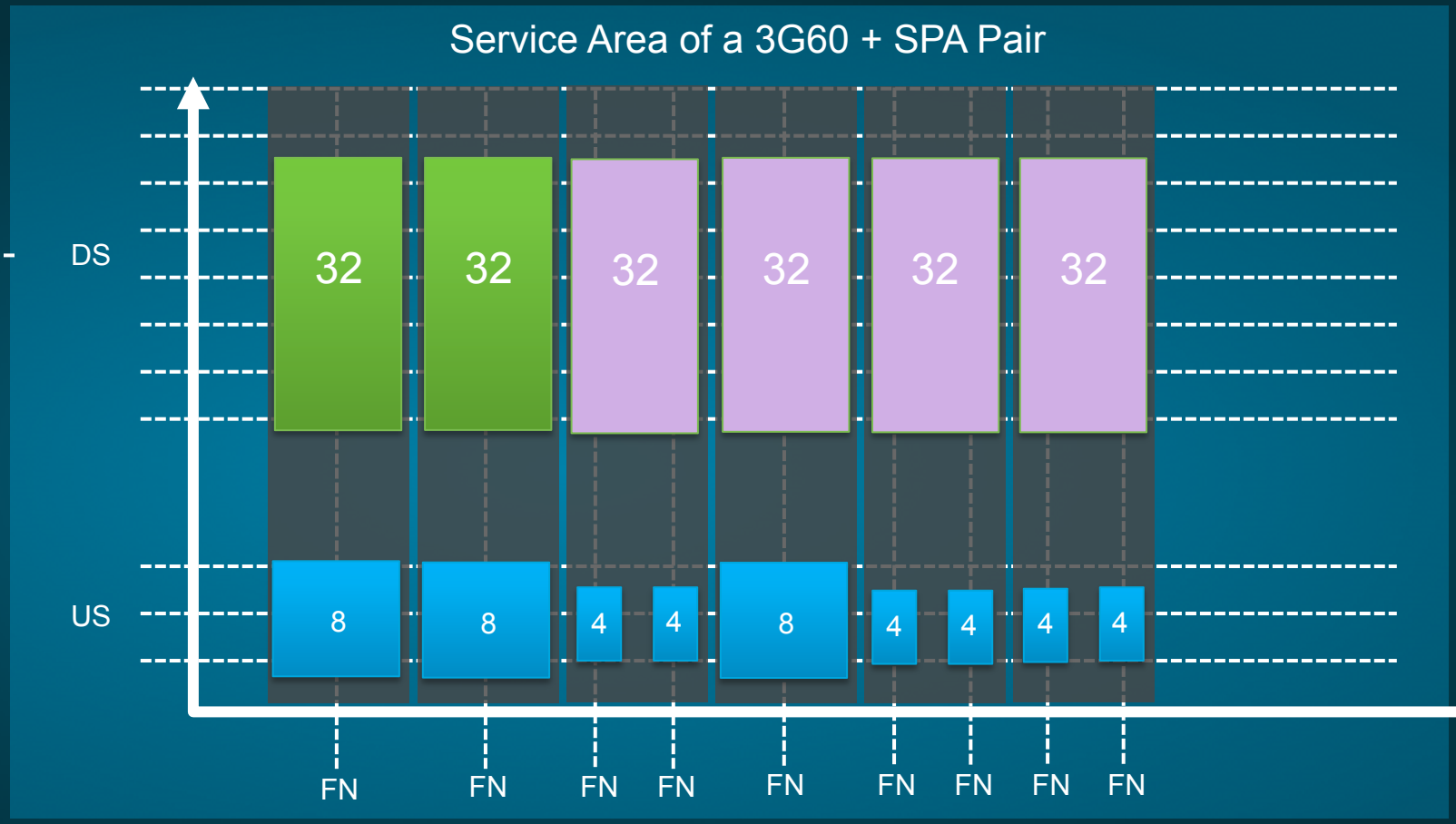
Provide 32 DS per SG with 6G-SPA

3G60+6GSPA

uBR10K

8 3G60
64 DS / 3G60
8 6G-SPAs
128 DS / SPA

1536 DS



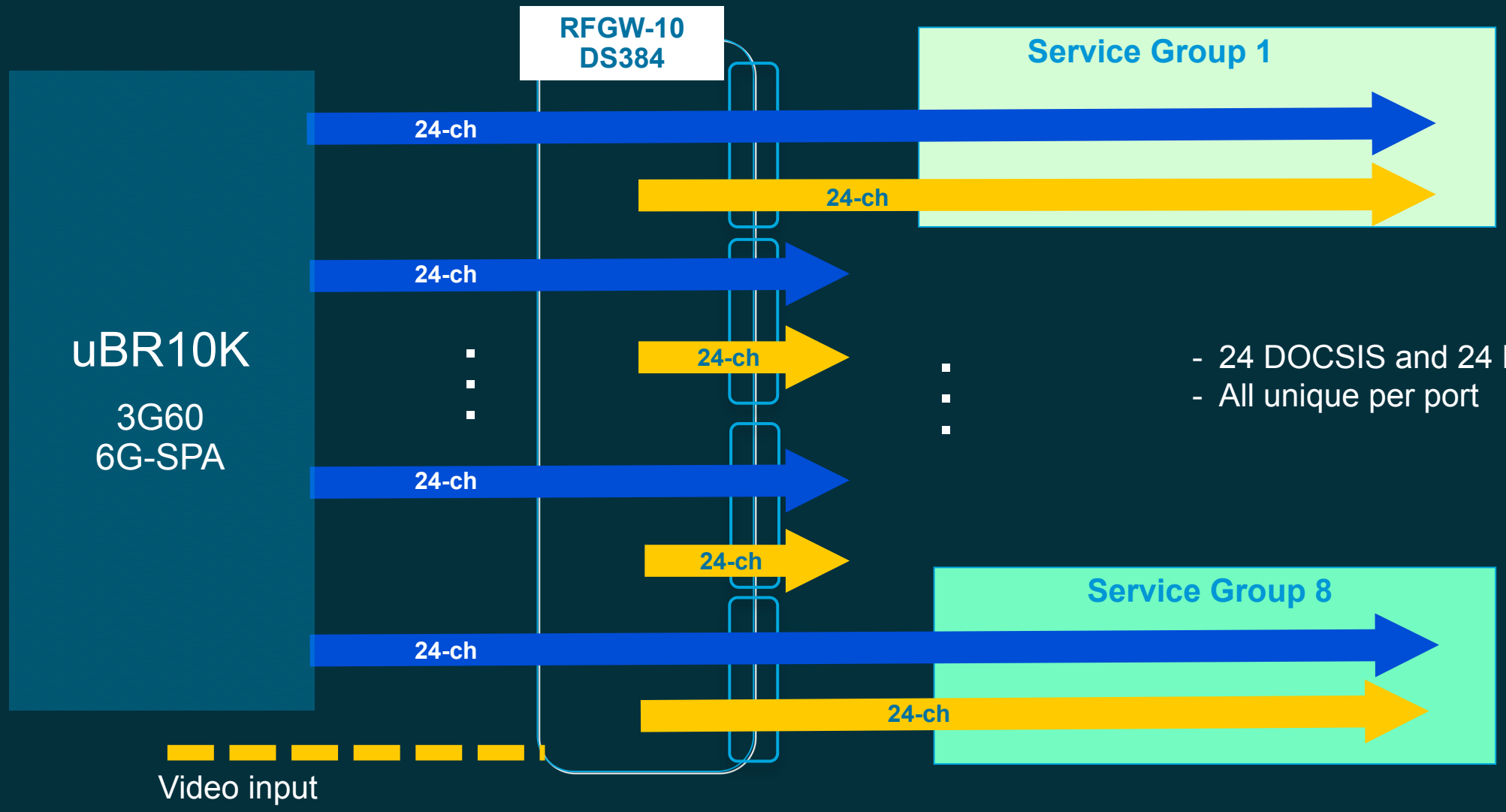
- 48 Downstream Service Groups

3G60

3G-SPA

Poll Question

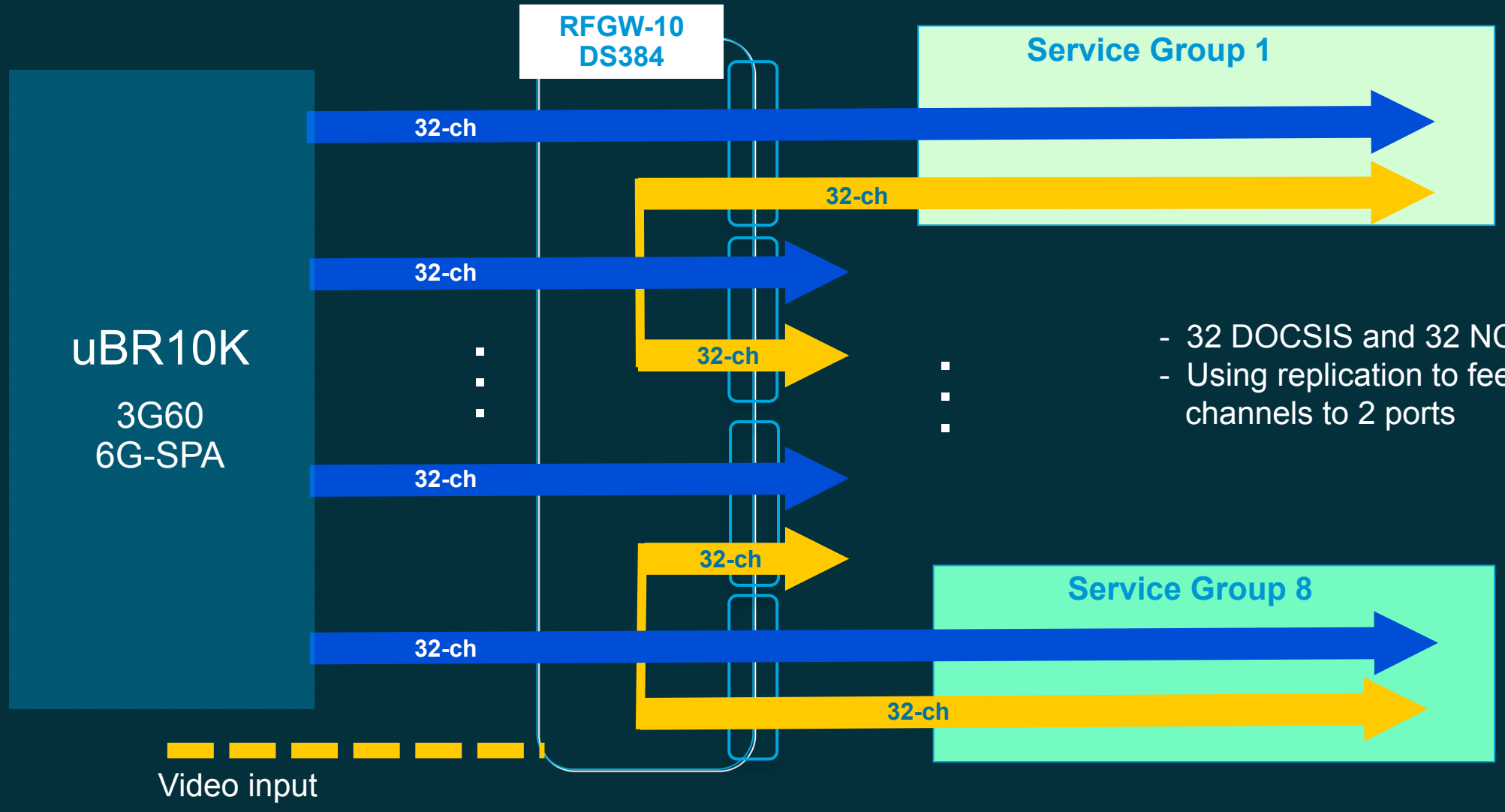
Converging DOCSIS and Video with RFGW-10



- 24 DOCSIS and 24 NC Video QAM channels
- All unique per port

Converging DOCSIS and Video with RFGW-10

Using QAM replication for video



- 32 DOCSIS and 32 NC Video QAM channels
- Using replication to feed 32 NC video channels to 2 ports

Summary

Bandwidth & IP Video	Global bandwidth demand continues to grow Faster networks enable more & better experiences Fastest growing residential services: Online Video & VoD
Modular CCAP “Gigabit DOCSIS”	Cisco’s modular CCAP solution, uBR10012 and RFGW-10, offers an incremental deployment approach and meets key CCAP objectives today Provides a scalable, cost effective path to 32 DS channels per service group
Integrated CCAP “Terabit DOCSIS”	Cisco’s integrated CCAP solution, cBR-8, provides industry leading density and capacity, with a path to scale to over 1 Tbps
DOCSIS 3.1 Remote PHY SDN	DOCSIS 3.1 & Remote PHY empower cable operators to compete effectively and economically with FTTx; SDN enables fast Service Velocity, superior Operational Flexibility and improved Network Performance

Thank you.