

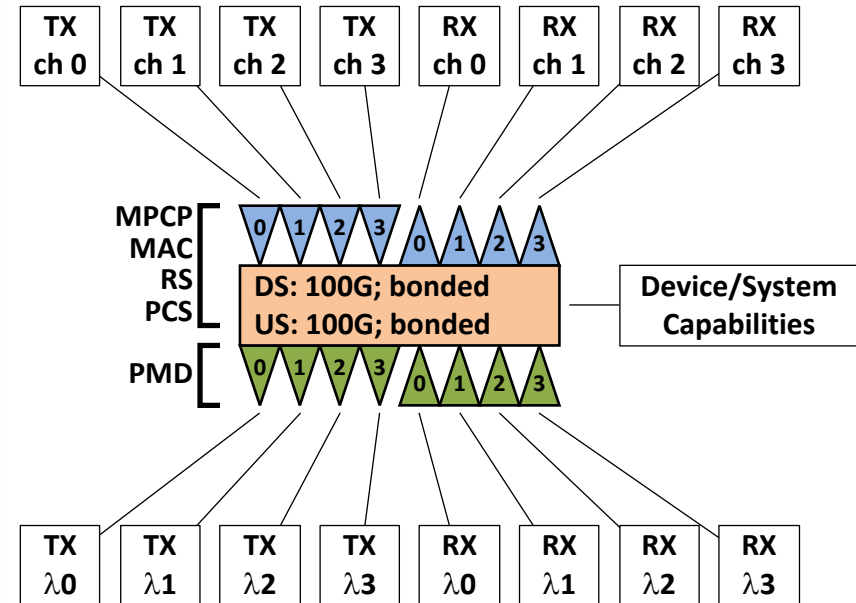
100G-EPON Configurations





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Goal: Extensible Architecture

- ❑ *How to define extensible, future-proof architecture that supports data rates from 25 Gb/s to 100Gb/s?*
- ❑ **It is enough for 802.3ca to specify only 100 Gb/s OLT/ONU operations.**
- ❑ **802.3ca shall allow parts of the specification to be omitted (not implemented) or disabled.**

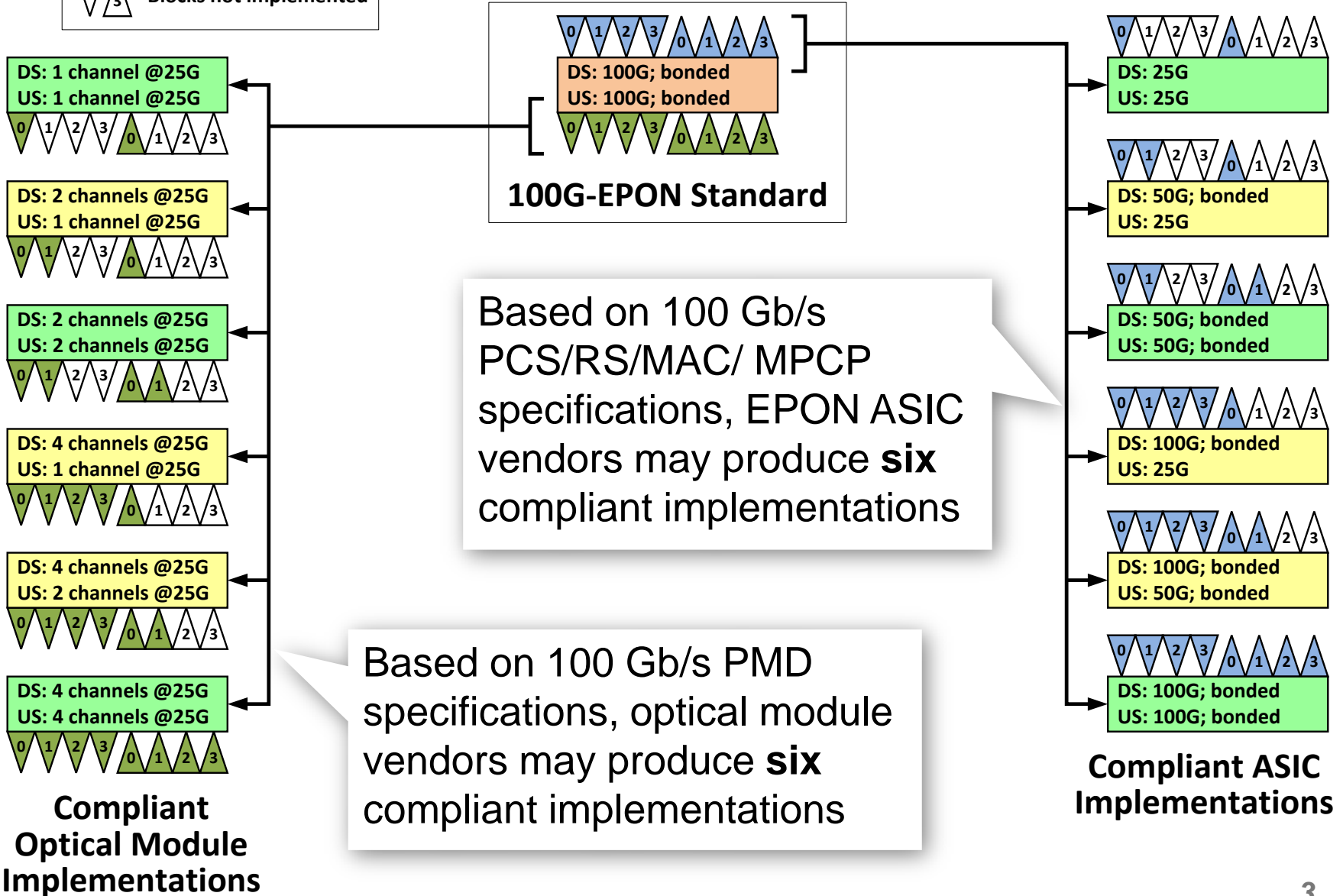
Abstract device/system representation used in this document



-  - Enabled IC blocks
-  - Enabled Optical Module blocks
-  - Blocks not implemented by component vendors
-  - Blocks disabled by system vendor

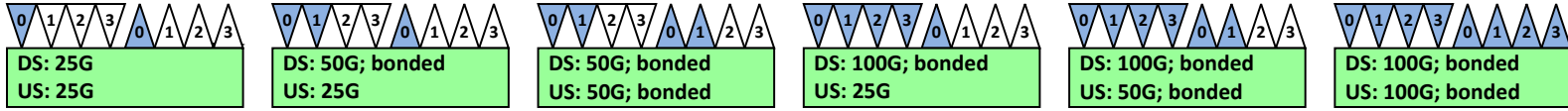
One Standard → Many Configurations

 - Blocks not implemented

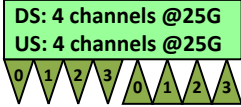
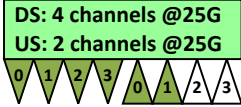
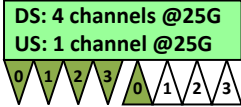
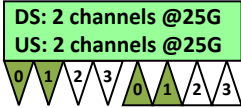
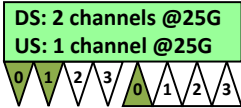
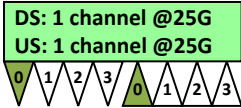


System vendor can mix & match

ASIC

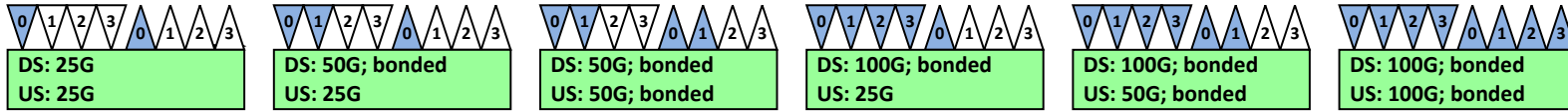


Optical Module

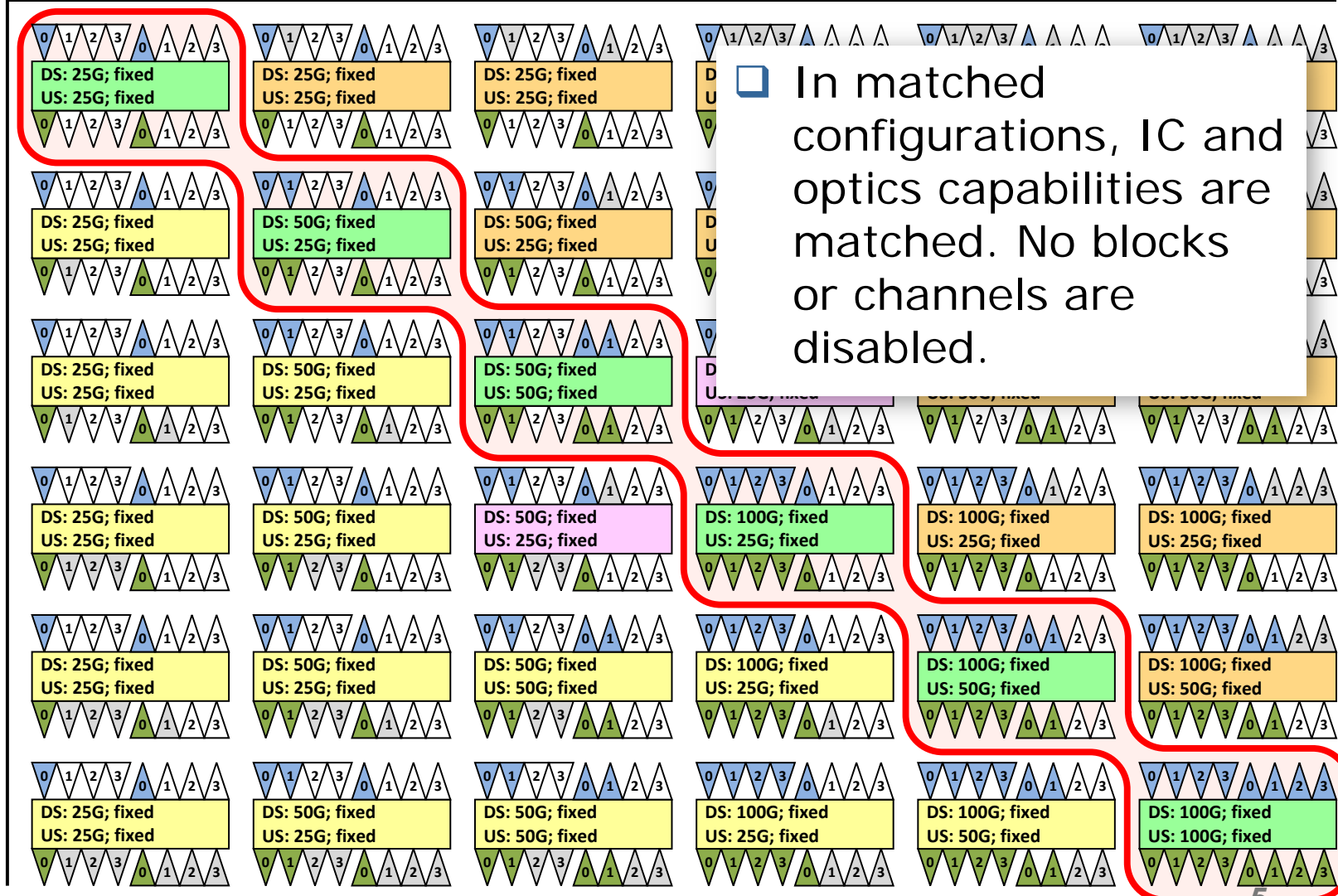
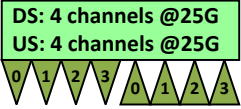
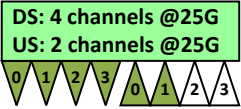
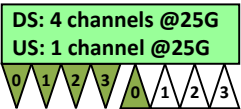
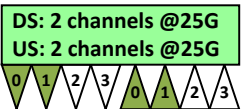
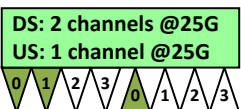
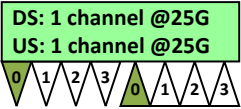


Matched Configurations

ASIC

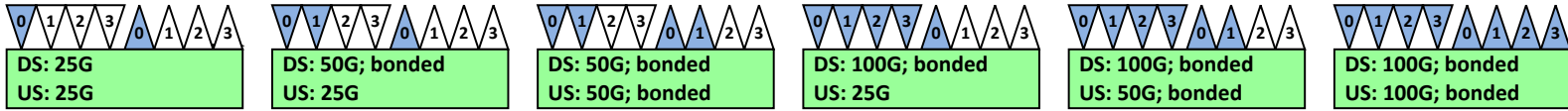


Optical Module



Optics-Limited Configurations

ASIC

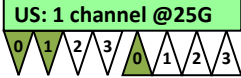


Optical Module

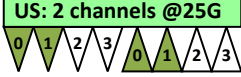
DS: 1 channel @25G
US: 1 channel @25G



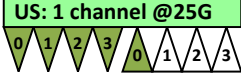
DS: 2 channels @25G
US: 1 channel @25G



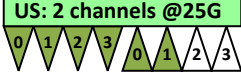
DS: 2 channels @25G
US: 2 channels @25G



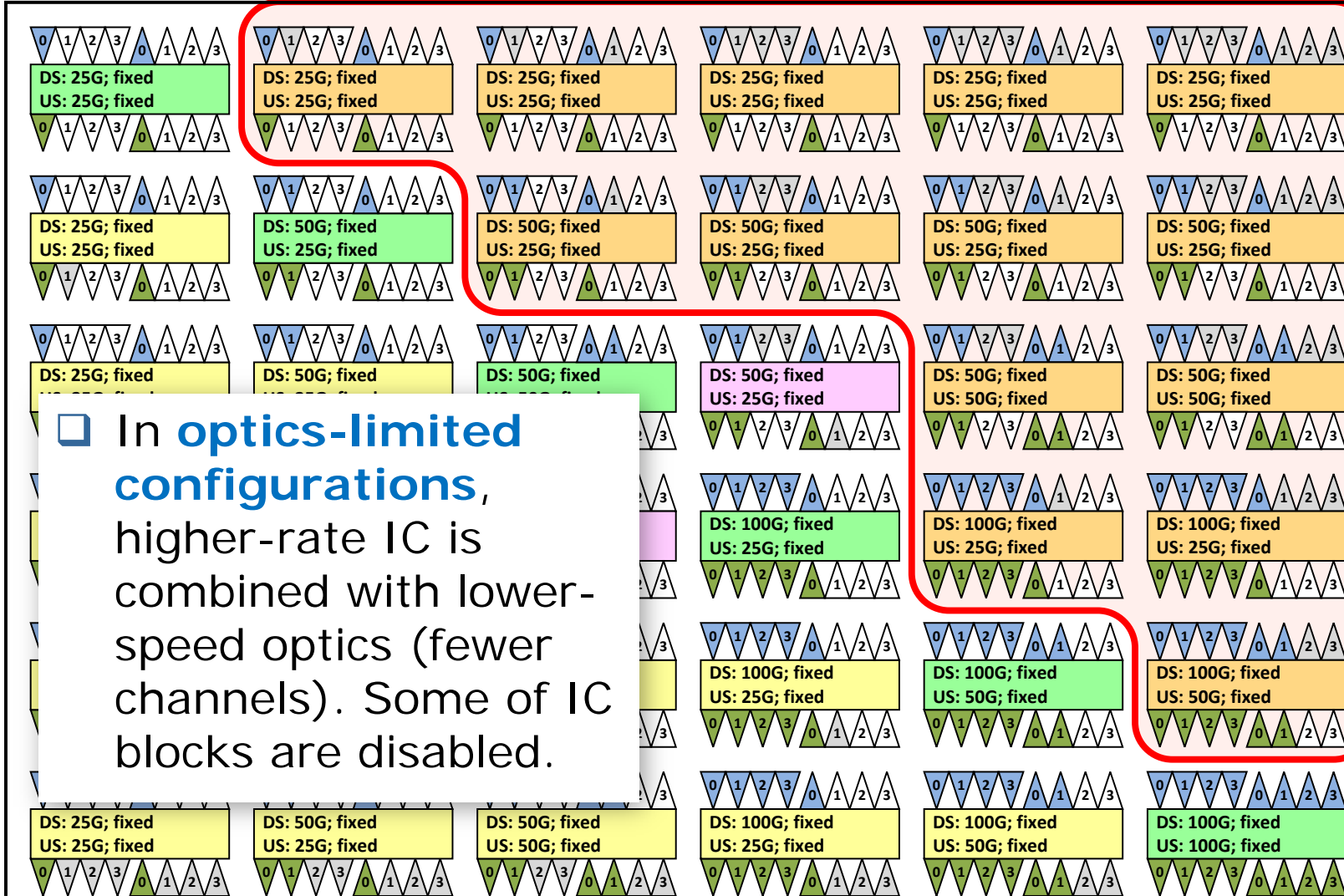
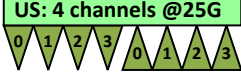
DS: 4 channels @25G
US: 1 channel @25G



DS: 4 channels @25G
US: 2 channels @25G



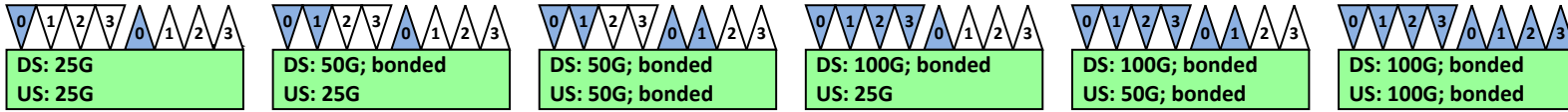
DS: 4 channels @25G
US: 4 channels @25G



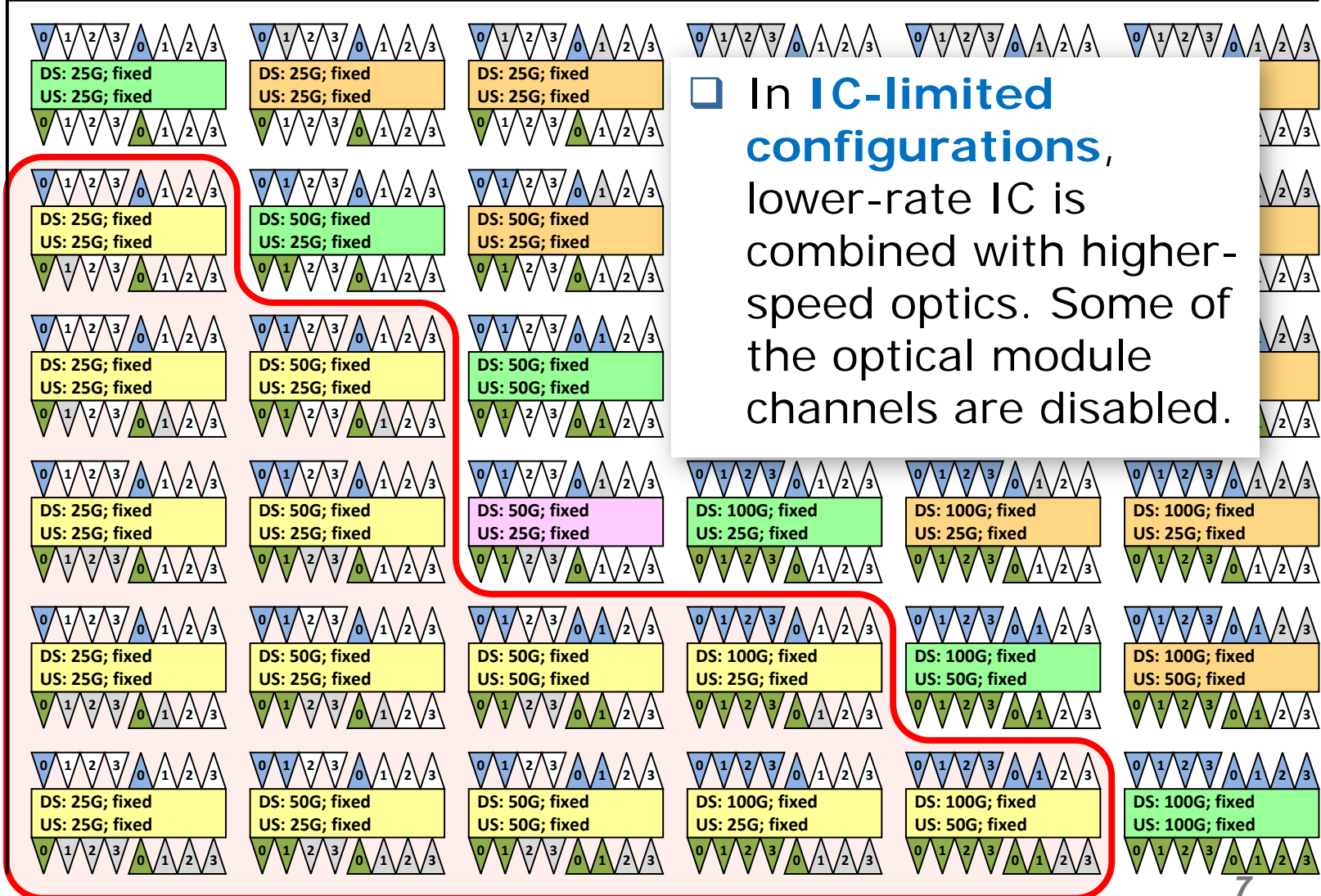
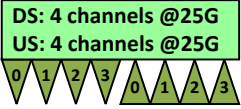
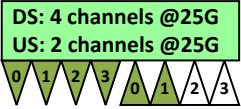
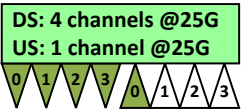
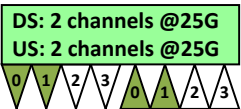
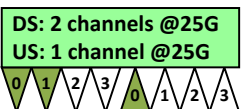
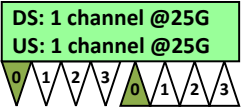
In **optics-limited configurations**, higher-rate IC is combined with lower-speed optics (fewer channels). Some of IC blocks are disabled.

IC-Limited Configurations

ASIC



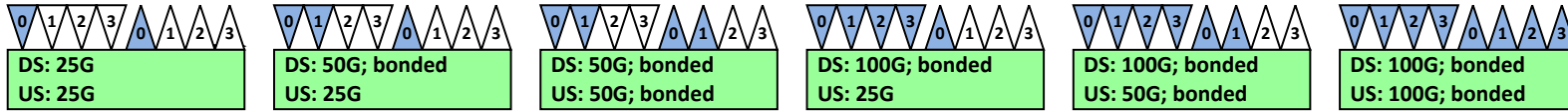
Optical Module



In **IC-limited configurations**, lower-rate IC is combined with higher-speed optics. Some of the optical module channels are disabled.

Mismatched Configurations

ASIC



Optical Module

DS: 1 channel @25G
US: 1 channel @25G

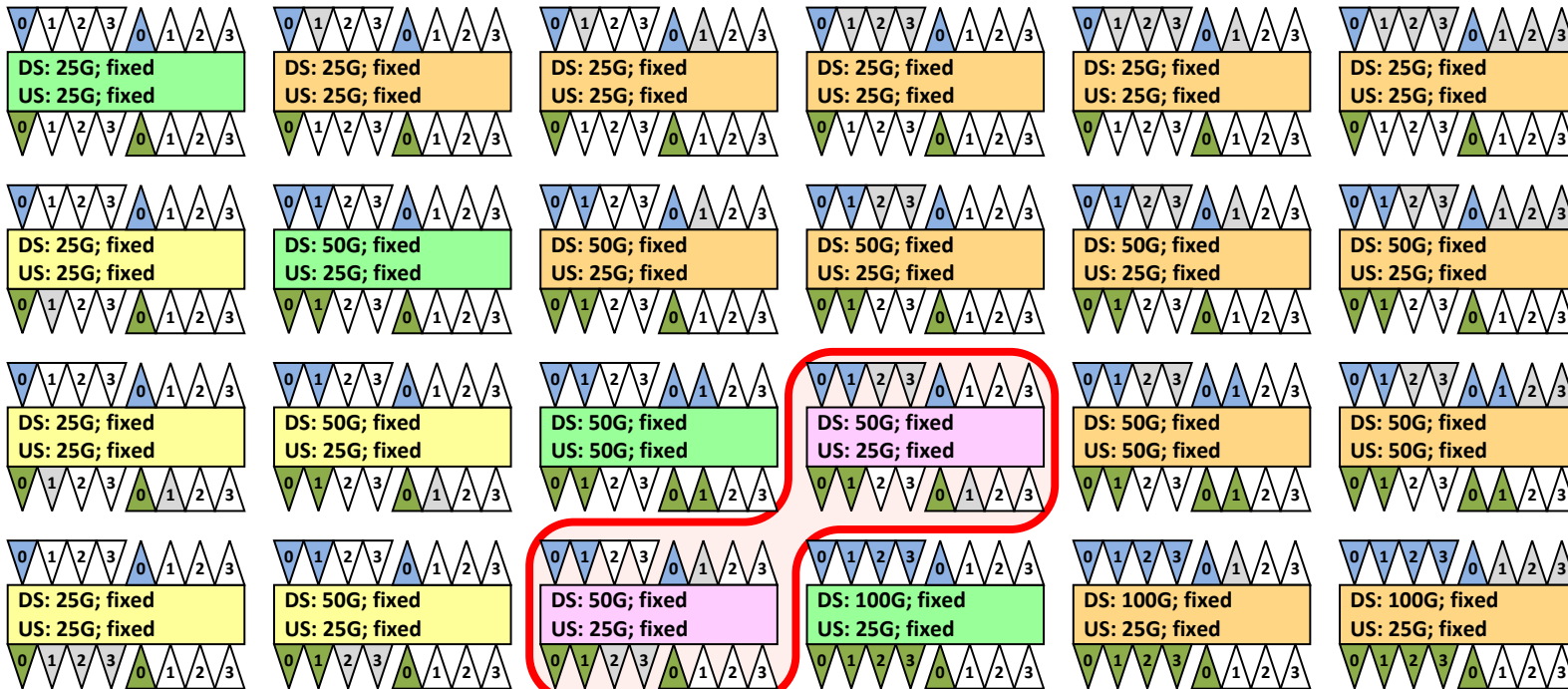
DS: 2 channels @25G
US: 1 channel @25G

DS: 2 channels @25G
US: 2 channels @25G

DS: 4 channels @25G
US: 1 channel @25G

DS: 4 channels @25G
US: 2 channels @25G

DS: 4 channels @25G
US: 4 channels @25G



❑ In **IC-and-optics-limited configurations**, one direction may be IC-limited, the other direction may be optics-limited. Some optical module channels and some IC blocks are disabled.

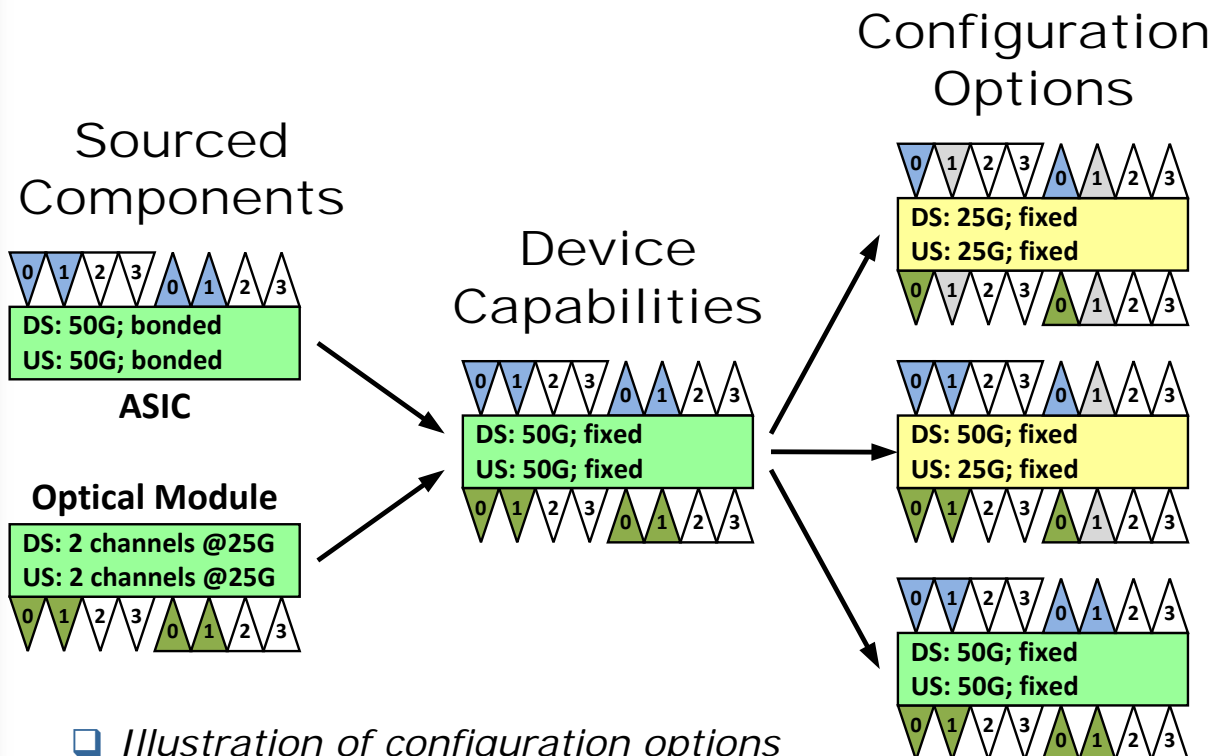
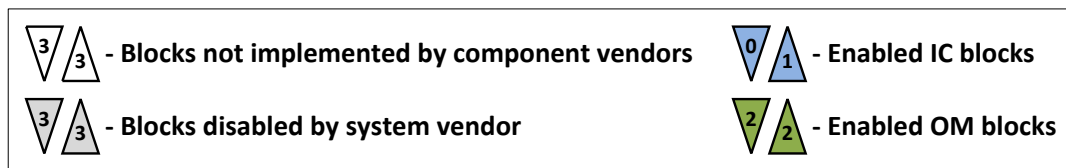
- ❑ Mismatched configurations probably make no sense
- ❑ Matched configurations – needed and are part of the objectives.
- ❑ Optics-limited configurations may be used as an intermediate step to defer the cost
 - An operator would start deployments with cheaper optics
 - Upgrade only pluggable optical modules when additional capacity is needed
- ❑ What about the IC-limited configurations?
 - Probably not very useful ... unless we decide to support wavelength selection.
 - Technical and economic analysis of wavelength selectability is a topic of a separate presentation

System Vendor Options

- Even if IC or OM vendors do not offer the full range of implementations allowed by the standard,

or if system vendors choose to procure only limited sets of IC/OM components,

the system vendors still may produce many compliant EPON device/system implementations via **permanent manufacturing-time configuration**



- Illustration of configuration options for a device/system based on 50 Gb/s ONU/OLT ASIC and 2-channel (50 Gb/s) optics

- ❑ Network operators may tailor their networks to specific deployment/area requirements by
 1. sourcing different systems with specific capabilities required for a given deployment
 2. sourcing a common system and configuring it at deployment time for specific requirements of a given deployment (static configuration)
 3. sourcing a common system and configuring it at run-time for specific requirements of a given deployment (dynamic configuration)

One Standard → Many Configurations

- ❑ Only 100 Gb/s OLT/ONU specifications are needed in 802.3ca (i.e., one standard)
- ❑ The standard should permit some functional blocks to be disabled or not implemented, thus allowing vendors to create various “sub-set” implementations, such as 25G-EPON, or 50G/25G-EPON, etc..
- ❑ The standard should ensure interoperability of all subset configurations.
- ❑ Market should decide which configurations are technically and economically justified, not the standard!

- ❑ **IC and OM component vendors** may produce multiple compliant products by omitting or disabling some of the functional blocks.
- ❑ **System vendors** may produce multiple compliant NG-EPON systems by sourcing different components and/or by applying permanent manufacture-time configuration.
- ❑ **Network operators** may achieve the required network flexibility by procuring NG-EPON systems with specific capabilities and/or by applying deployment-time (static) or run-time (dynamic) configuration.

Thank You