100G-EPON Configurations

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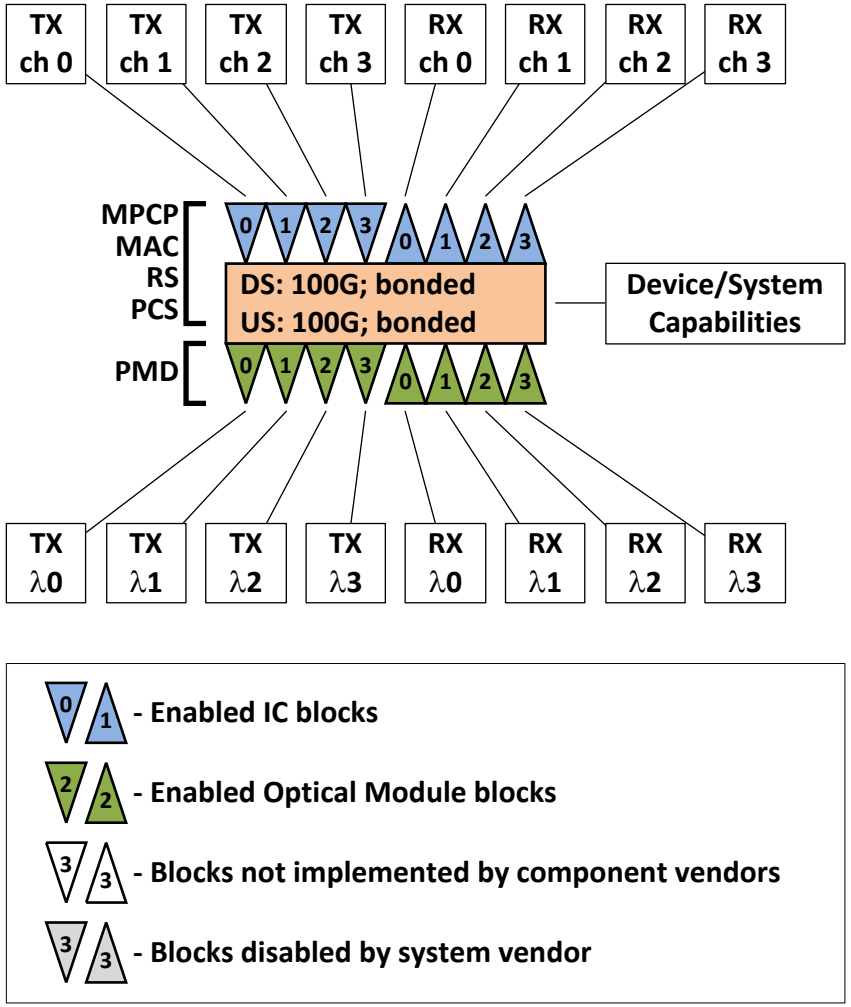
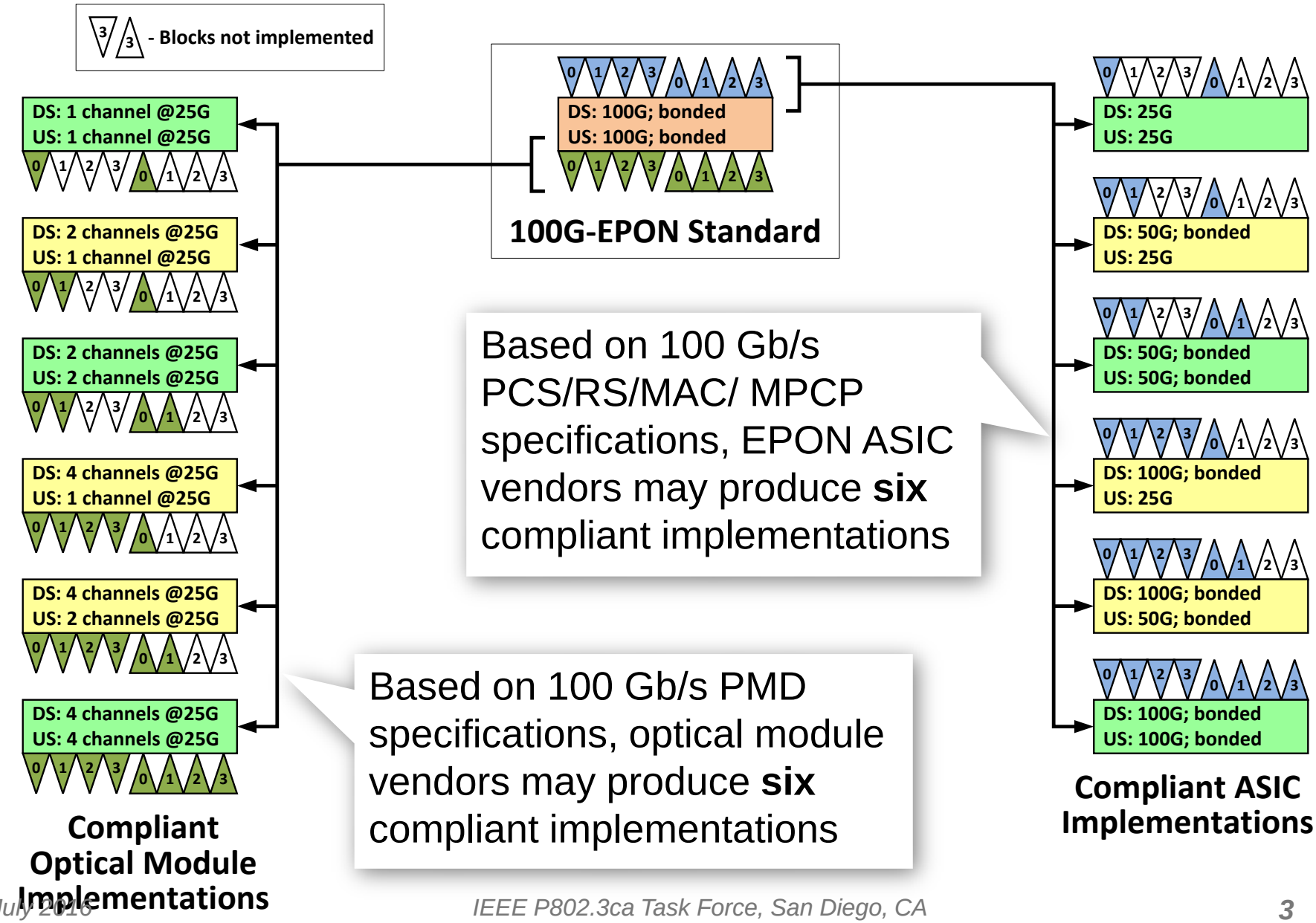
Goal: Extensible Architecture

- ***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.**

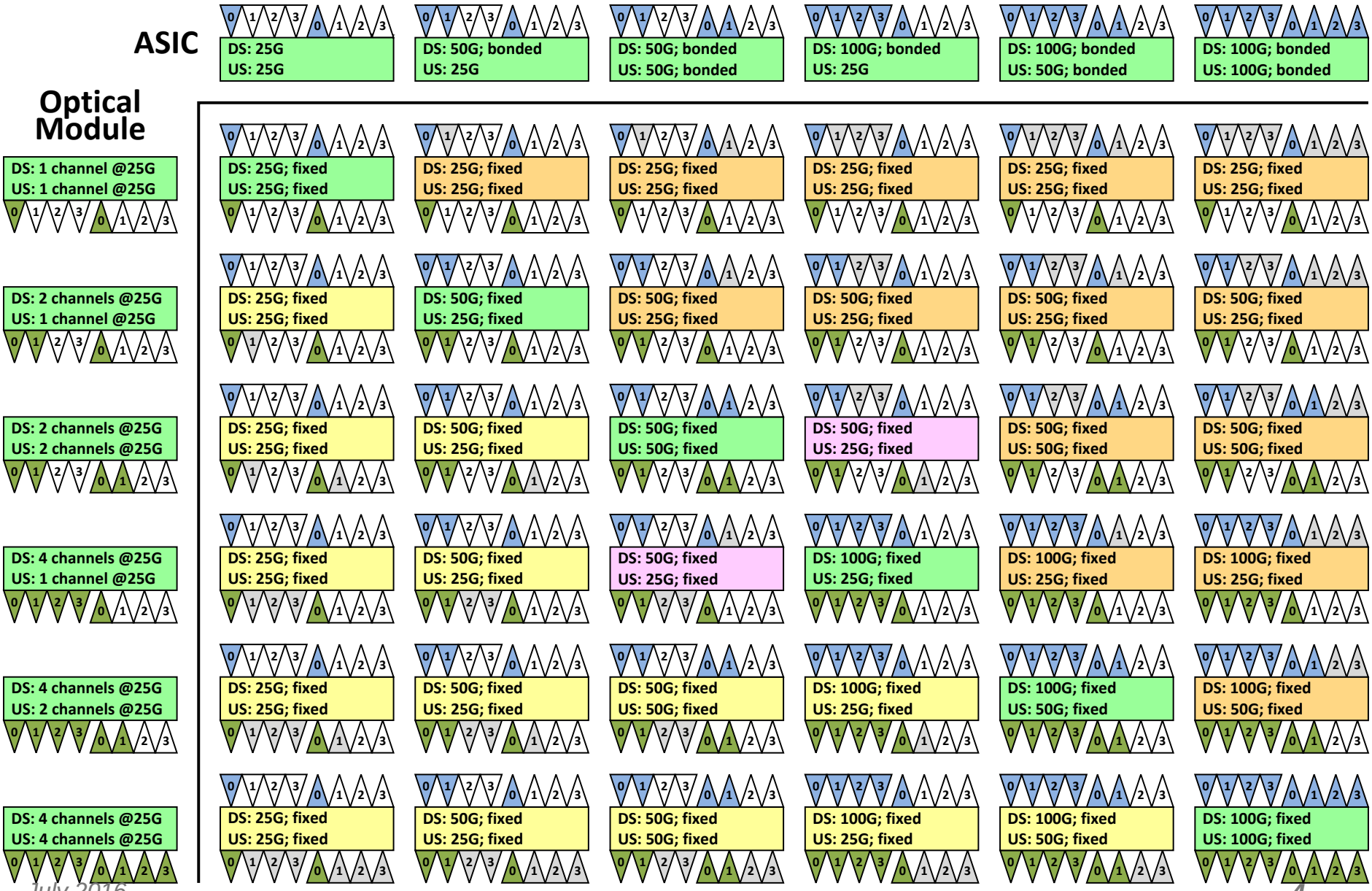
Abstract device/system representation used in this document



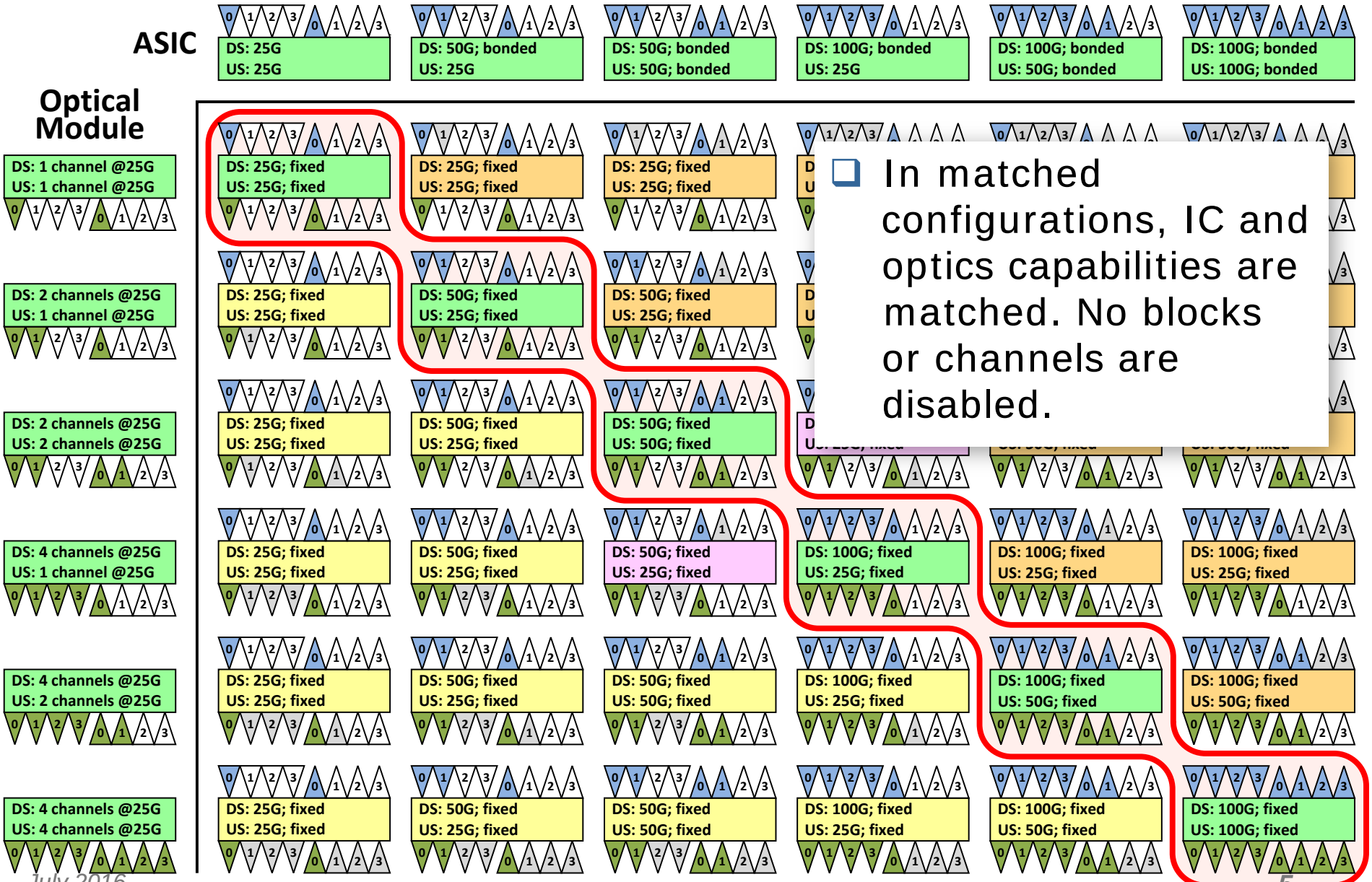
One Standard → Many Configurations



System vendor can mix & match

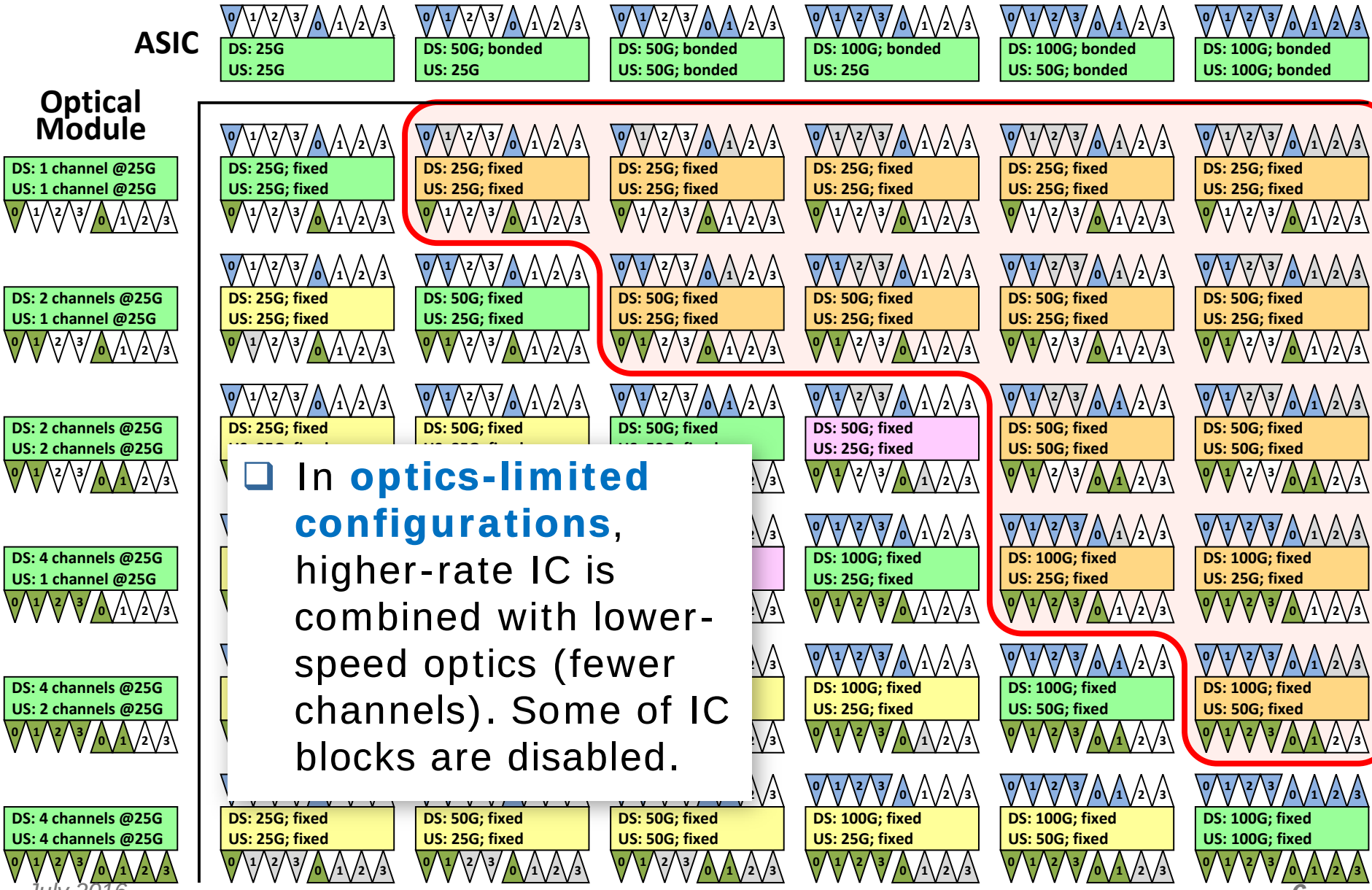


Matched Configurations



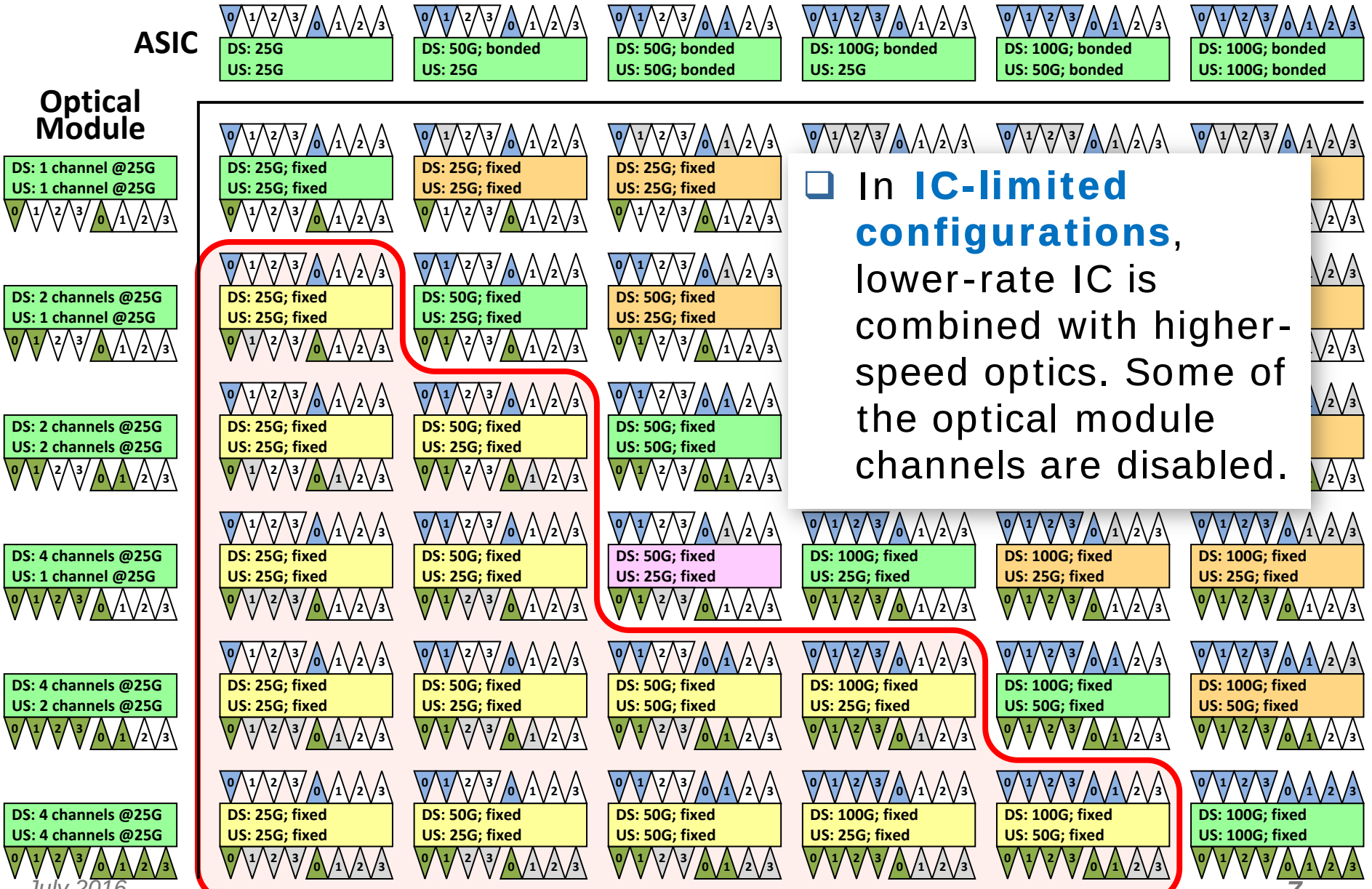
- In matched configurations, IC and optics capabilities are matched. No blocks or channels are disabled.

Optics-Limited Configurations



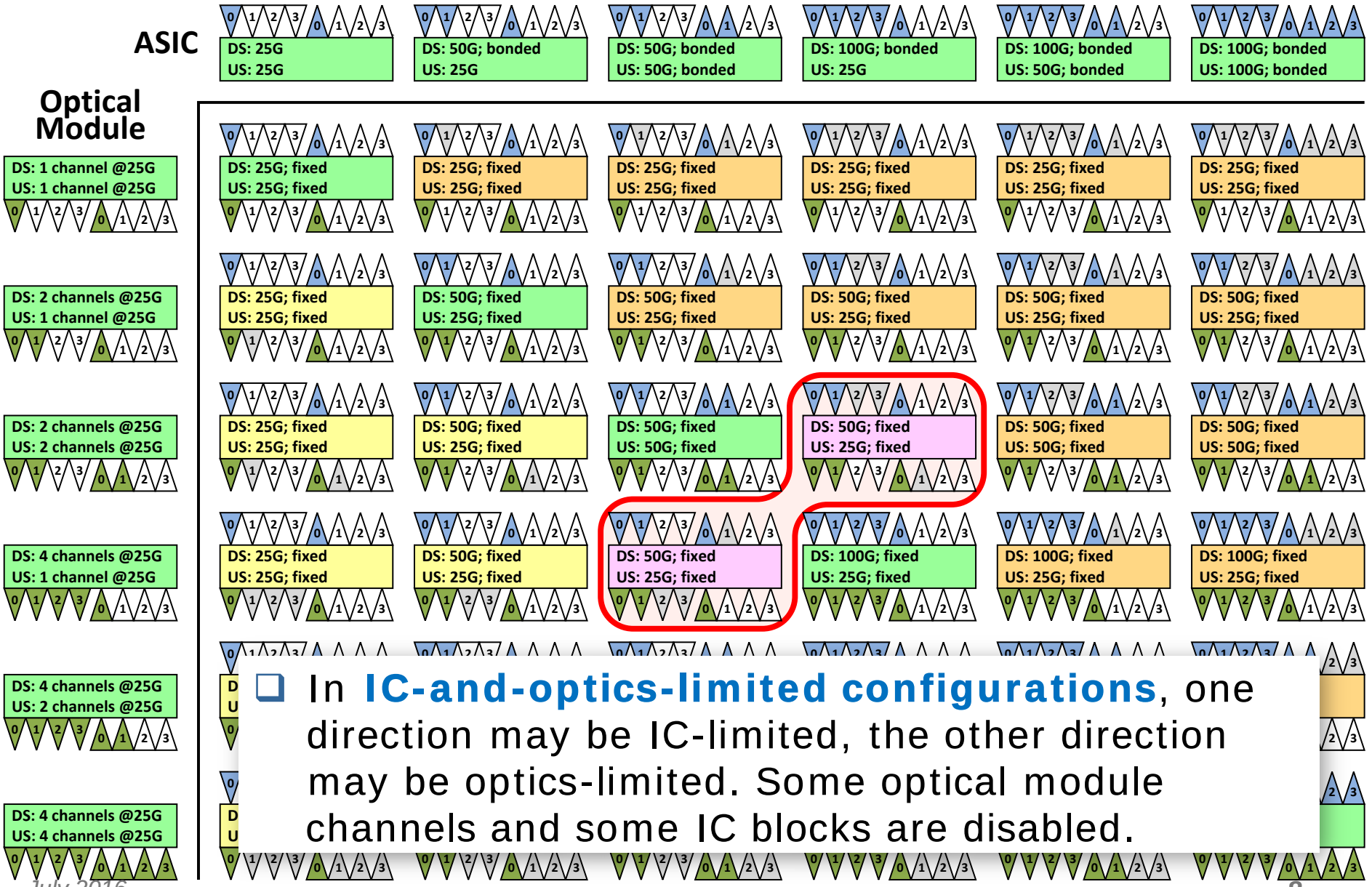
- In **optics-limited configurations**, higher-rate IC is combined with lower-speed optics (fewer channels). Some of IC blocks are disabled.

IC-Limited Configurations



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

Mismatched Configurations



- 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.

System Options

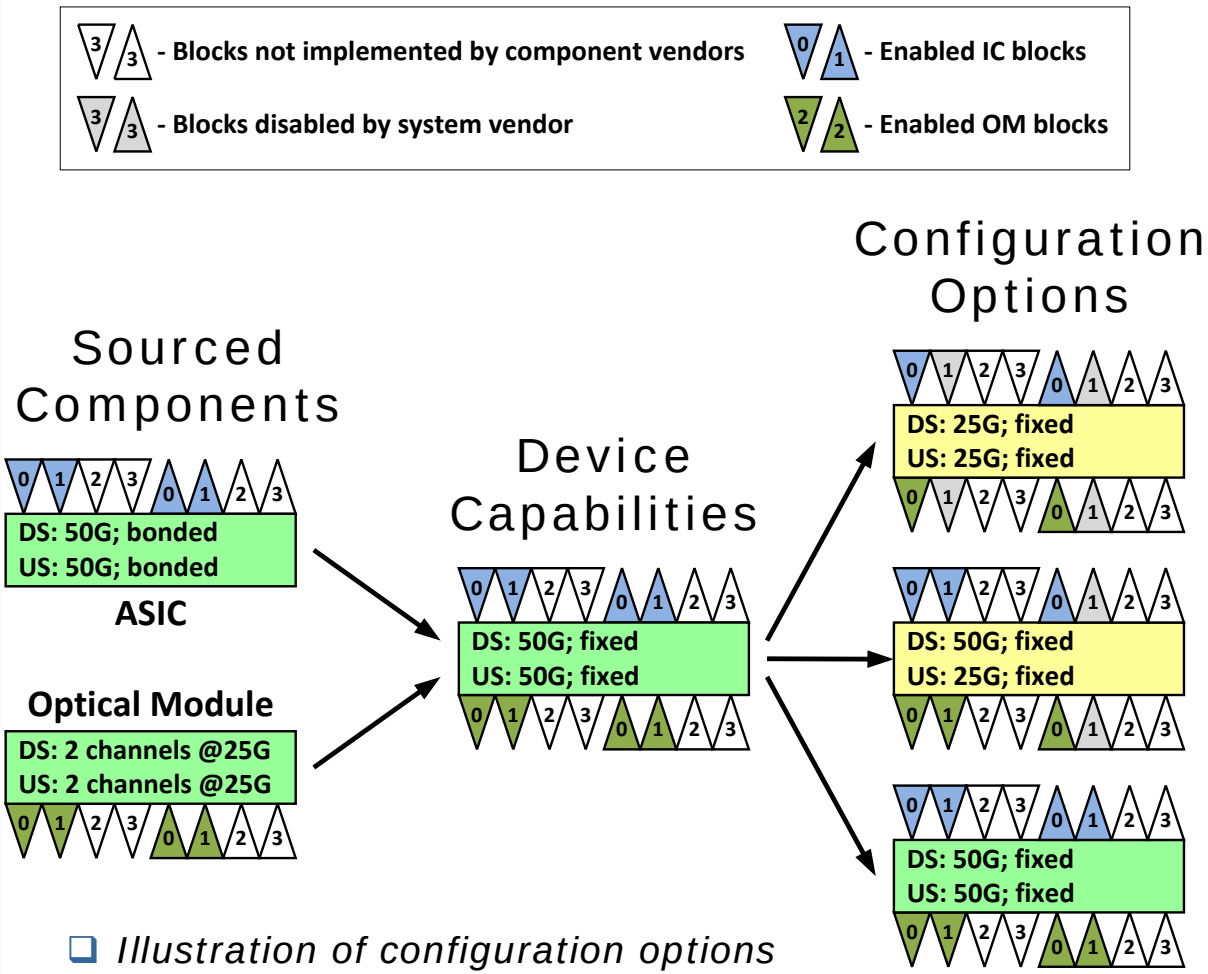
- Mismatched configurations probably make no sense
- Matched configurations – needed and are part of the objectives.
- Optics-limited configurations may be used as an intermediate step to defer the cost
  - An operator would start deployments with cheaper optics
  - Upgrade only pluggable optical modules 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*

Operators' Options

- 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!

Standard flexibility

- **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