Bait and Switch

= Toss out a Brick to Attract Jade

#17 from Thirty Six Strategies of Ancient China

Prepare a trap by creating the illusion of easy gain.
Place the Cart Before the Horse

= Ben Mo Dao Zhi
Introduction

Why consider both 100G and 400G?

- Because next generation 100G and 400G should use common technology to leverage R&D investment

Do we have the answers to what 400G should be?

- No, because the real work is still to be done. We need to have the discipline not to jump to architectural decisions before we complete analysis. Huawei is showing technical leadership in doing the solid work required to find the right solution as demonstrated the IEEE 802.3 400G Study Group meeting in Indian Wells.
SiP or InP Mod w/ Driver (MD) are alternatives

CWDM alternative does not require a TEC

LR4 is 4W typical in a CFP4 module (3W in a QSFP28)
Ultimate 100G: 1x100G λ HOM Linear

- Similar architecture to 10GbE-LRM SFP+
- Will leverage CFP2 AOC development
- Supports 4x density increase over 4x25G
- Requires future CMOS technology
100G Next Step Alternatives Roadmap

Each next step has advantages and disadvantages
Baseline Next Step 100G: 2x50G λ NRZ (Quad)

- ½ CW Laser and ~2.5W per 100GbE channel
- Conventional, demonstrated NRZ Electronics & Optics
- Benchmark against which to compare more complex steps

56Gb/s TX Simulated Eye
## 100G SMF Module Road Map

<table>
<thead>
<tr>
<th>Module Type</th>
<th>CFP</th>
<th>CFP2</th>
<th>CFP4</th>
<th>QSFP28</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LC port electrical I/O</strong></td>
<td>10x10G</td>
<td>10x10G</td>
<td>4x25G</td>
<td>4x25G</td>
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<tr>
<td>1 RU slot 100G ports</td>
<td>4 (single row)</td>
<td>8 (single row)</td>
<td>32 (belly-to-belly)</td>
<td>36 (double row)</td>
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<tr>
<td><strong>MPO ports electrical I/O</strong></td>
<td>8x50G</td>
<td></td>
<td>4x50G</td>
<td></td>
</tr>
<tr>
<td>1 RU slot 100G ports</td>
<td>32 (single row)</td>
<td></td>
<td>64 (belly-to-belly)</td>
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</tbody>
</table>
400G Possible Today: 4x 4x25G λ NRZ (PSM)
Ultimate 400G: 4x100G λ HOM Linear

- Will leverage CFP2 AOC development
- Requires future CMOS technology
Each intermediate step has advantages and disadvantages
Baseline 400G: 8x50G λ NRZ

- 8 DFB DMLs; 16W typical (CW λ + Mod is an alternative)
- Benchmark against which to compare more complex steps
Alternative 400G: 4x100G λ PAM-4

- 4 CW λ; 20W typical
- Requires 50G technology; same as on page 6 & 11
## 400G SMF Module Road Map

<table>
<thead>
<tr>
<th>Module Type</th>
<th>4x CFP4</th>
<th>CDP* (TBD)</th>
<th>CDP2 (= CFP2)</th>
<th>CDP4 (= CFP4)</th>
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<td>16x25G</td>
<td>8x50G</td>
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<tr>
<td>1 RU slot 400G ports*</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>16</td>
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* To Be Defined by CFP MSA with System OEMs
## 100G & 400G Modules

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<th>I/O</th>
<th>10x10</th>
<th>10x10 4x25</th>
<th>4x25</th>
<th>16x25</th>
<th>8x50</th>
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Thank you!