DE-CIX Apollon
Cutting Edge Interconnection for DE-CIX members
RIPE66 Dublin

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• Status Quo DE-CIX Network Topology

**Key Components:**

1. Force10 Terascale E1200
2. Multiple 10G-Connections
3. Force10 Exascale E1200i
4. Multiple 10G-Connections
5. DWDM MUX 32 Channel
6. Lynx LightLeader Master Unit
7. Dark Fiber Working Line
8. Dark Fiber Protection Line
9. Lynx LightLeader Slave Unit
10. DWDM MUX 32 Channel
11. 2xBrocade MLX32 and 1xForce10 Exascale 1200i per Core
Platform – Status Quo

- Current access-switches (F10 ExaScale E1200i) allow max. ~80 customer ports (10GE), no 100GE possible
- No LACP for backbone connections, no link monitoring BFD
- MAC learning issues on the core switches
- 1:1 redundancy in the core – 3 core switches doing nothing at the time
- No multipathing via multiple core switches
- In case of failover about 400 x 10GE connections are switched simultaneously and need to work immediately – testing beforehand not possible
- Monitoring of backup links also not possible
- 5% light on backup links via LightLeader has unwanted side effects on backup cores
- Reseller ports only via hardware looping
• **Goals**
  
  – DE-CIX Apollon will provide cutting edge interconnection on a 100GE level by choosing and implementing new infrastructure for both the optical layer and the switching layer.
  
  – Apollon needs to support traffic and customer port growth for the next 3-5 years. This includes scalable capacity in the core of up to 20Tbps in 2016 and 45 Tbps in 2018.
  
  – Replace 1:1 redundancy in the core with n+1 redundancy.
  
  – Keep local traffic local (switch and site).
  
  – Core links must be 100GE to reduce the number of links, to better utilize bandwidth, and to be able to accommodate larger flows.
  
  – Redundancy and multipathing on upper protocol layers.
Technology selection

- We need an optical platform and a switching platform
- Gather information
- Make a decision matrix
- Output: Short list – 3 vendors for optical, 3 vendors for switching
- Do extensive Lab tests with shorlisted parties
• Technology selection: Optical Platform
  – 100G! 100G! 100G!
  – 80 DWDM Channels, 28G each (4 = 100G)
  – Fiber protection
  – Fast (< 100ms) protection switching
  – Scalability
  – Compact size (rack mountable)
• Adva System
• Technology selection: Switching Platform
  – 100G capable
  – High port density (for 10G and 100G)
  – 3rd party transceivers possible
  – Multipathing (via MPLS)
  – Port security at the edge
  – VLAN translations functionality
• Shortlist (Switching)
• Lab tests
  – Up to 4 cores (2 minimum)
  – 2 “new” access switches
  – 2 “old” access switches (to emulate migration scenario)
  – Devices to emulate customers, 100G interconnections etc.
  – Simulate all scenarios we could think of
  – Simulate the migration from old to new
### Decision matrix

<table>
<thead>
<tr>
<th>Kategorie</th>
<th>Gewichtung</th>
<th>Kriterien</th>
<th>Bewertung</th>
<th>Wichtung</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funktion</td>
<td>50%</td>
<td>130</td>
<td>15%</td>
<td>130</td>
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<tr>
<td>Stabilität</td>
<td>30%</td>
<td>300</td>
<td>10%</td>
<td>300</td>
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<tr>
<td>Leistung</td>
<td>20%</td>
<td>500</td>
<td>13%</td>
<td>500</td>
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<tr>
<td>Qualitätsmanagement</td>
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<td>13%</td>
<td>250</td>
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<tr>
<td>Service</td>
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<td>250</td>
<td>10%</td>
<td>250</td>
</tr>
<tr>
<td>Fertigung/Support</td>
<td>5%</td>
<td>125</td>
<td>10%</td>
<td>125</td>
</tr>
</tbody>
</table>

*Note: The table contains further details and criteria for each category, but they are not transcribed here.*
Technology: And the winner is…

- **Optical Layer**
  - Adva FSP3000 DWDM
  - Up to 80 x 28GBit/s (=2TBit/s per fiber pair)

- **Switching Layer**
  - Alcatel-Lucent („ALU“) 7950 XRS-20
  - Up to 80 x 100GE or 800 10GE per chassis
  - 10 chassis in total incl. 4 x Apollon Supernodes (core) in 4 secure locations
- **Alcatel-Lucent 7950 XRS-20**
  - **Pro**
    - Ready for multi chassis
    - Best implementation of required features
    - Excellent hardware performance
    - Migration scenario possible
  - **Con**
    - Only DC chassis (needs external rectifiers)
    - No sflow (counter & samples; implementation necessary)
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• VPLS / MPLS Design
- New Topology (snapshot)
• **Migration**
  - Should be as painless for the customers as possible.
  - No impact on daily ops
  - **Decision:** Hire a dedicated project manager
  - **Involve every department**
    - Sales: Make customers and prospects aware of the upcoming migration
    - Support: Handle customer requests before, during and after migration
    - Engineering: Do most of the actual work
    - Marketing: Create Apollon branding, visual messaging, PR
• Migration (core)
• Migration Steps
  – Replace the core first
    • Add one new core switch
    • Remove one old core switch
    • Continue until all cores are replaced and 4 new cores are active
  – Replace the edge switches one by one
  – Lots of getting up early in the morning for customer support and engineering
- Migration Setup

- Setup with hard switch from Ethernet to MPLS
- Setup with both Ethernet/MPLS, but separated Edge/Core links
- Setup with both Ethernet/MPLS via common link
• Edge migration
  – Connect new edge routers to the new core
  – Keep old edge switch running
  – Move customers fibre by fibre
  – Test each customer after moving
  – Try to keep individual downtime as short as possible
  – During each migration customer support will also be in the office to handle customer requests and questions.
Summary

- DE-CIX Apollon will provide a larger spectrum of Ethernet based interconnection services incl. Internet Exchange and Layer 2 data link functionality.
- Yes – there will be new products. We will keep you posted.
- DE-CIX is a one-stop shop for interconnection in an all Ethernet and all IP environment. All backed by industry leading SLAs.
Questions?

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