Peering: Success or Failure

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SANOG 24, India
Terrestrial and Submarine Cable Connectivity in South East Asia:
New IIG on 2012:

East Side
Singapore

INDIA

West Side
Europe/USA

STM-4 Terrestrial
STM-4 : SMW-4
STM-4 :
Submarine or Terrestrial

IIG : International Internet Gateway

Client A
Client B
Client C
AS Wise Traffic Engineering:

- **Equinix** STM-4
- **TATA** STM-4
- **Bharti UK** STM-4

Client A

Client B

Client C

- AS Wise
- Prefix Wise

- **A** : 200 mbps
- **B** : 600 mbps
- **C** : 800 mbps

-----------------------
Total : 1600 mbps
Traffic Distribution and End Result:

**Congestion**

- Equinix STM-4
- Client A
- Client B
- Client C
- Bharti UK STM-4

**80%**

- TATA STM-4

**20%**

- Bhariti UK STM-4

- AS Wise

- 58587 ISP/IIG
CDN is Near:

F@H —> Bharti UK —> CDN

F@H —> Equinix IX —> CDN
<table>
<thead>
<tr>
<th>Peer Port Name</th>
<th>Avg Inbound (Mbps)</th>
<th>Avg Outbound (Mbps)</th>
<th>Max Inbound (Mbps)</th>
<th>Max Outbound (Mbps)</th>
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<td>Time 2</td>
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<td>0.47</td>
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</table>
• Singapore Route become congested.
• Traffic Engineering is not working.
• Need bigger port of STM-16 / GE / 10GE.
• POS STM-16 is too much Expensive.

Solution : Reduce the IPLC cost at London Side. 
( Traffic Engineering at Layer – 1 )
Connectivity with UTL, Nepal via Terrestrial Cable:

- **INDIA**
  - New Delhi
  - Gorakhpur, UP
  - *Sunauli (UP)

- **NEPAL**
  - UTL, Birgunj
  - Kathmandu – UTL Nepal POP
  - UTL, Butwal
  - UTL Bhairahawa

- TCL

- UTL
Connectivity with Taschi Cell, BHUTAN via Terrestrial Cable:

- TCL Node
- Tashicell Node
- TCL Terrestrial Fiber
- Power Grid Tower
- OPGW

Siliguri, India

Kolkata

Siliguri

TCL Terrestrial Fiber

Local Ring

Power Grid OPGW

Pagli, Bhutan

Malbase

Power Grid OPGW
Cables at Chennai:

Cables
- Bay of Bengal Gateway (BBG)
- SeaMeWe-4
- Tata TGN-Tata Indicom
- i2i Cable Network (i2icn)
Cables at Mumbai:

- Bay of Bengal Gateway (BBG)
- Europe India Gateway (EIG)
- FLAG Europe-Asia (FEA)
- FLAG FALCON
- Gulf Bridge International Cable System
- IMEWE
- SEACOM/Tata TGN-Eurasia
- SeaMeWe-3
- SeaMeWe-4
Cables at Malaysia:

**Penang:**
- Bay of Bengal Gateway (BBG)
- FLAG Europe-Asia (FEA)
- SAFE
- SeaMeWe-3

**Melaka:**
- Batam Dumai Melaka (BDM) Cable System
- Dumai-Melaka Cable System
- SeaMeWe-4

**Mersing:**
- Asia Submarine-cable Express (ASE)
- Asia-America Gateway (AAG) Cable System
- SeaMeWe-3

**Kuantan:**
- APCN-2
- Asia Pacific Gateway (APG)
- Malaysia-Cambodia-Thailand (MCT) Cable
Submarine Cable Connectivity at Bangladesh:

**Cable Name:**
Sea-Me-We 4

**Operator:**
Bangladesh Submarine Cable Company Limited (BSCCL)

One Terrestrial Landing Station with India.
<table>
<thead>
<tr>
<th>SDH</th>
<th>Payload</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC-12 ( E1 )</td>
<td>2,176 Kbps</td>
</tr>
<tr>
<td>VC-3 ( DS3 )</td>
<td>48,384 Kbps</td>
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<tr>
<td>VC-4 ( STM-1)</td>
<td>149,760 Kbps</td>
</tr>
<tr>
<td>VC-4_4c ( STM-4-POS )</td>
<td>599,040 Kbps</td>
</tr>
<tr>
<td>VC-4_16c ( STM-16-POS )</td>
<td>2,396,160 Kbps</td>
</tr>
</tbody>
</table>
Traffic Distribution and End Result:

STM4 frame

Concatenated VC4 (VC4-4c)

R SOH
M SOH

Payload

SOH  VC4  VC4  VC4  VC4

149.76+149.76+149.76+149.76

599.04

SOH  VC4-4c

POS

599.04
Technical Advantages of Using MUX:

1) GFP (GENERIC FRAMING PROTOCOL)
2) VCAT (VIRTUAL CONCATENATION)
3) LCAS (LINK CAPACITY ADJUSTMENT SCHEME)
VIRTUAL CONCATENATION:

MUX

SOH  VC4-4c

MUX

GE

GFP

Encapsulation  Mapping  Multiplexing  Transmission

Decapsulation  Demapping  Demultiplexing
VIRTUAL CONCATENATION:

MUX - MUX

GE - GE

VC4 - VC4

GFP

Encapsulation → Mapping → Multiplexing → Transmission → Demultiplexing → Demapping → Decapsulation
LINK CAPACITY ADJUSTMENT SCHEME:

599 Mbps
LINK CAPACITY ADJUSTMENT SCHEME:

- MUX
- GE
- 447 Mbps
- VC4
- MUX
- GE
- 447 Mbps
- VC4
Traffic Distribution and End Result:

F@H → STM4:VC4_4c → Equinix

- 23 STM-4 POS
- F@H GE
- Equinix GE
- 4 x VC4 MUX

F@H → MUX → 4 x VC4 → MUX → Equinix

- GE
- MUX
- 4 x VC4

F@H → MUX → 6 x VC4 → MUX → Equinix

- GE
- MUX
- 6 x VC4
Traffic Distribution and End Result:

F@H  STM4:VC4_4c  Bharti UK

POS  POS

F@H  MUX  1 x VC4  MUX  Bharti UK

POG  GE  GE
Traffic Distribution and End Result:

Congestion

- Equinix STM-4
  - POS

80%

- TATA STM-4
  - POS

20%

- Bharti UK STM-4
  - POS

A:
- 200 mbps

B:
- 600 mbps

C:
- 800 mbps

POS

Client A

Client B

Client C
Traffic Distribution and End Result:

- **EQUINIX GE**
  - 894 mbps

- **TATA GE**
  - 596 mbps

- **Bharti UK GE**
  - 149 mbps

- **MUX**
  - 58587 mbps

- **58587 IIG**
  - 1313 mbps

- **Client A**: 200 mbps
- **Client B**: 600 mbps
- **Client C**: 800 mbps
Capex and Opex:

- **Peering Cost:**
  - Equinix Co-location Charge
  - Equinix IX Peering Charge

- **IP Transit Cost:** Almost the Same as Peering Cost

*How can we justify Cost?*
Commercial Implication on Capex:

**POS : MIC-3D-4OC3OC12-1OC48 ( By Juniper )**
Description : Low density multirate MIC, 4 port non-channelized OC3-OC12 / 1 port non-channelized OC48 MIC, (Requires a pluggable SFP optics module )
Replacing Router with MUX and GE Port Mux:

Ports at the Base:
- 2 x STM-64
- 4 x STM-16
- 4 x GE
End Result:

- Performance Increase
- Unknown Destination Become Very Near to Us.
- Traffic Engineering is now working evenly at Layer 1.
- Pay what you use in Physical Layer (IPLC).
- Opex Reduced as Singapore is near to Bangladesh and IPLC is costlier to London.
- Capex reduced, as POS cards are really expensive.
- Router is for routing and Transmission Equipment is Transmitting.

*Peering – Performance - Price*
Present Google Traffic:

![Graph showing Google Traffic]

- **1.5 Gbps**
- **1 Gbps**
- **500 Mbps**
- **0 bps**

The graph illustrates the traffic flow from 17 Feb to 18 Feb, showing peaks and troughs throughout the day.
AS: 58587

OPEN Peering

- EQUINIX Singapore
- Global Switch Singapore
- Mumbai
- Chennai
- London (TeleHouse East)
- Bangladesh
Thank You.

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