Integrated Solutions for Broadband Access in Brazilian Amazon Rural Areas

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Outline

- Brazilian Amazon Scenario
- Used Technologies
- Key Factors
- Challenges
- Conclusions
- Next Steps
Brazilian Amazon Scenario
Brazilian Amazon Scenario

- Main characteristics:
  - Dense forests and large rivers.
  - Reduced telecommunications infrastructure.
Using optical backbone and wireless networks could allow broadband access in remote cities (NavegaPará Project).

Optical backbone was built using supervisory channel available on power transmission system.

Wireless networks use an IEEE 802.16-based solution.
Used Technologies

Optical Backbone – Stage 1
(almost 1,800 km length and up to 17.5 Gbps transmission rates)
Used Technologies
Used Technologies

Optical Backbone (using WDM and SDH technologies)
Used Technologies

Wireless Networks:

- **Backhaul Links**: almost 50 km length and up to 300 Mbps transmission rates.

- **Point-Multipoint Links**: up to 3.2 km length and up to 32 Mbps transmission rates.
Used Technologies
Used Technologies

REDE GENÉRICA – CIDADES ATENDIDAS POR INFOVIAS
Key Factors

- Costs per customer:

<table>
<thead>
<tr>
<th>City Size</th>
<th>Vendor A (US$)</th>
<th>Vendor B (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (up to 15)</td>
<td>7,380</td>
<td>8,050</td>
</tr>
<tr>
<td>Medium (up to 45)</td>
<td>3,180</td>
<td>4,950</td>
</tr>
</tbody>
</table>

- Network management (almost 400 customers on 13 cities, only on NavegaPará Stage 1).

- Providing services to private entities.
Challenges

- Equalizing income \(x\) expenses.
- Defining a fair solution counterpart of municipalities.
- Network maintenance for a long-term operation.
Conclusions

- Combined solutions for broadband access on rural areas are the best way to increase the availability of telecommunication services on such regions.

- However, keys factor as cost deployment and network management must be carefully analyzed.
Next Steps

- Using Network Simulator to analyze the different possibilities of network utilization for all services available, specially on wireless networks.
Further Information

- www.navegapara.pa.gov.br
- www.lea.ufpa.br
- www.lvsouza.ufpa.br
Thank you for your attention!