Target cost for Sliceable Bandwidth Variable Transponders in a Real Core Network

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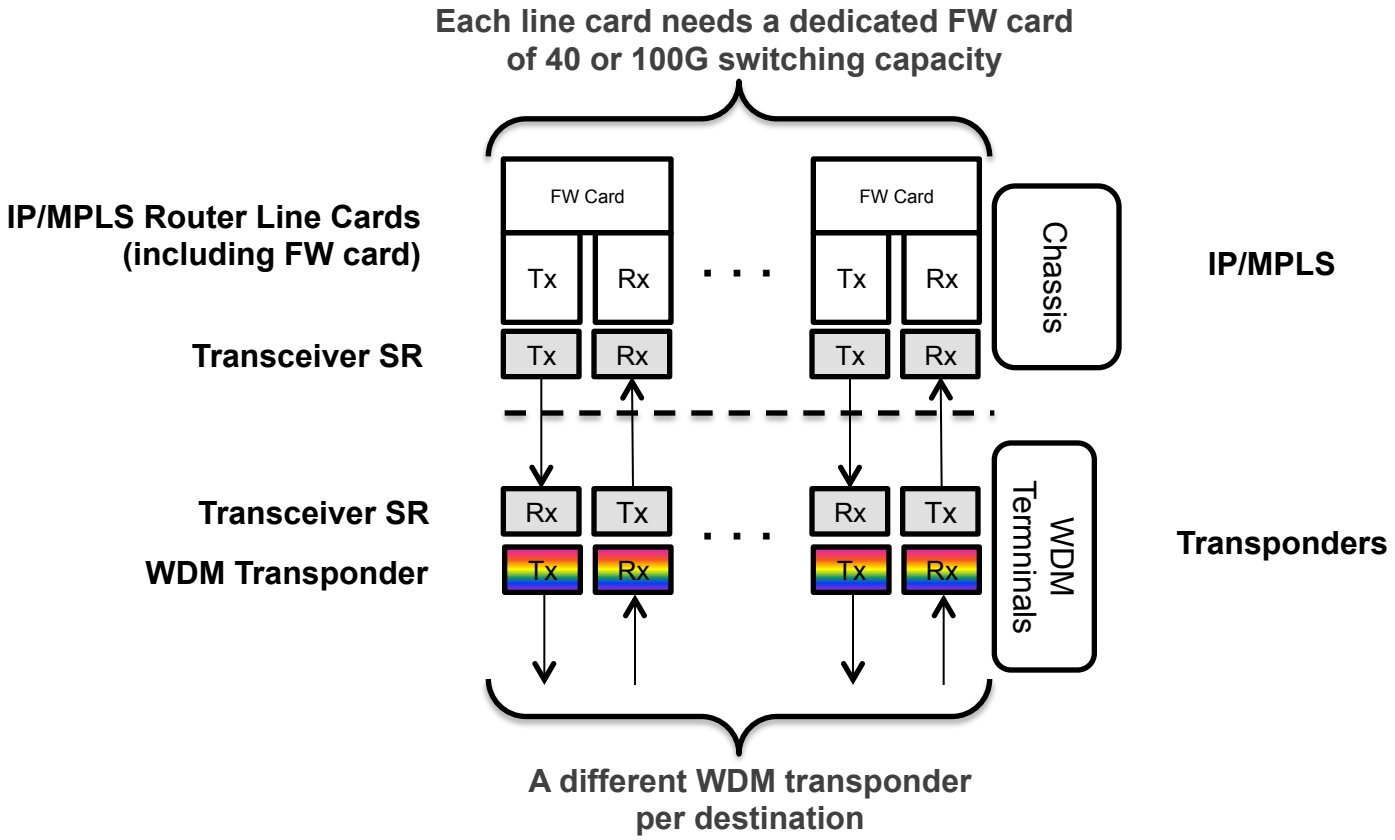
Motivation and Objective

- Considerations & Objective:
  - We aim to compare a Node Model with current WDM transponders vs. Node Model with Sliceable Bandwidth Variable Transponders (S-BVT).
  - In an IP/MPLS over WDM core network scenario.
  - In order to:
    - Quantify the required network elements (i.e. IP/MPLS line cards, WDM transponders, etc.)
    - Calculate the target cost of the S-BVT to achieve a certain cost saving percentage with respect to the current network architecture.

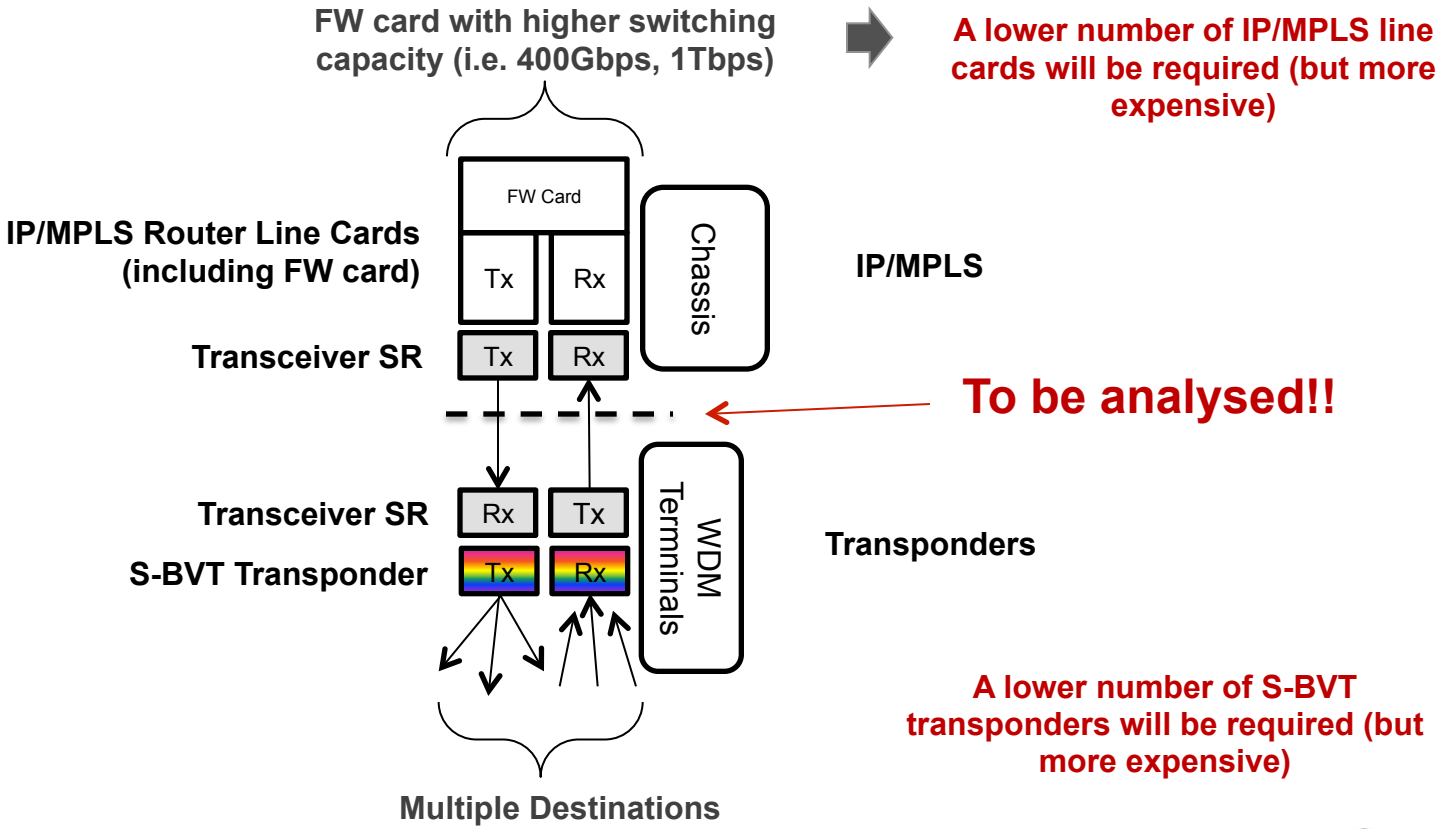
Current node structure without SBVTs

- Node model for the study:



Node structure with SBVTs

- Node models for the study:

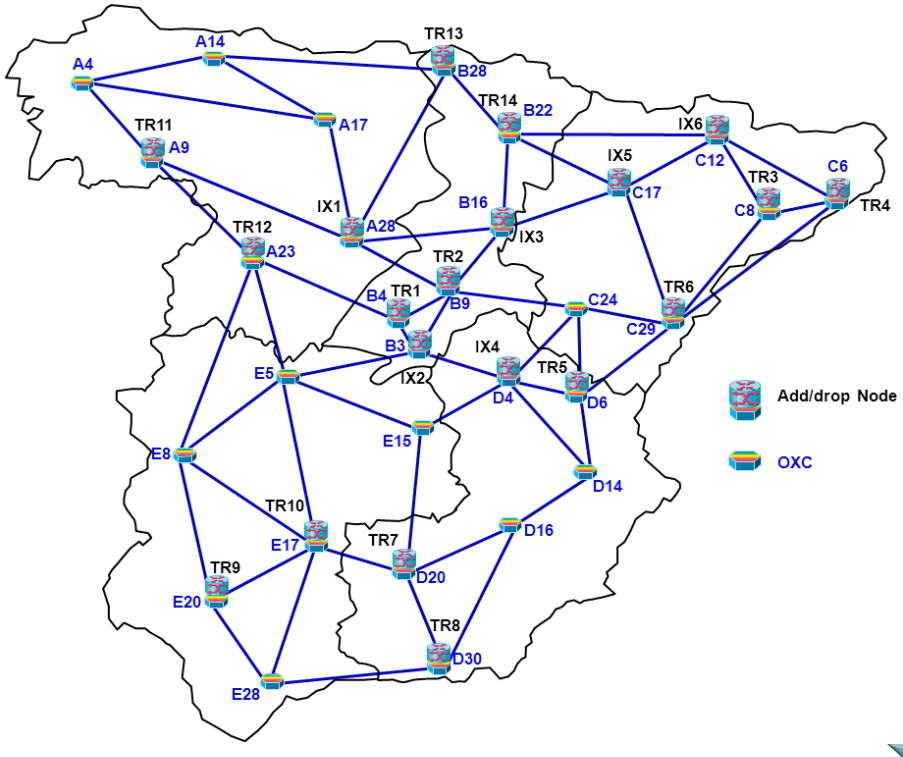


Study Assumption

- **Objective**:
  - Find target cost in the Sliceable BVT (SBVT) to achieve a target % of savings in the transponders.
- Assumptions:
  - S-BVT parameters:
    - Total bandwidth: 400Gbps, 1Tbps
    - Minimum granularity per destination: 40Gbps.
  - Fixed Grid parameters:
    - Just Coherent transmission considered (40G, 100G, 400G and 1T)
    - Cost from STRONGEST model
  - Traffic considerations:
    - Over-dimensioning factor :
      - 30% (example: 35Gbps x 1.3 = 45.5Gbps)
    - Annual traffic growth:
      - 50% per year.

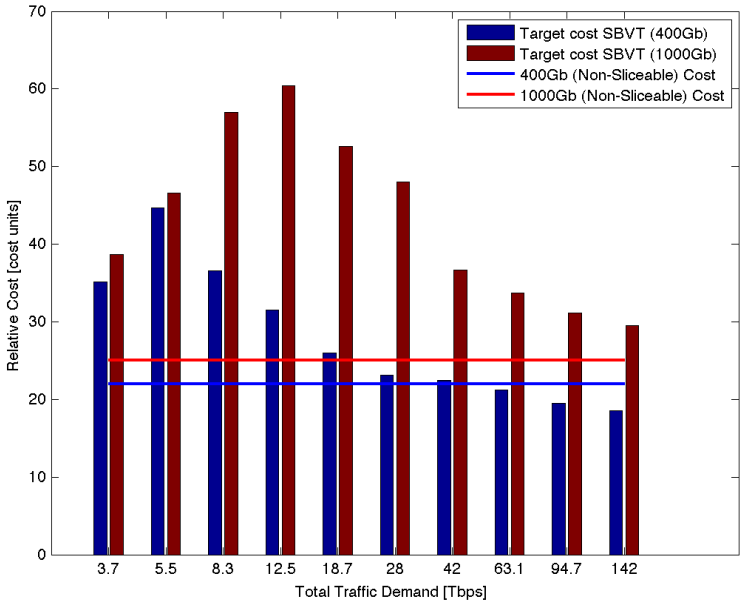
Spanish backbone scenario

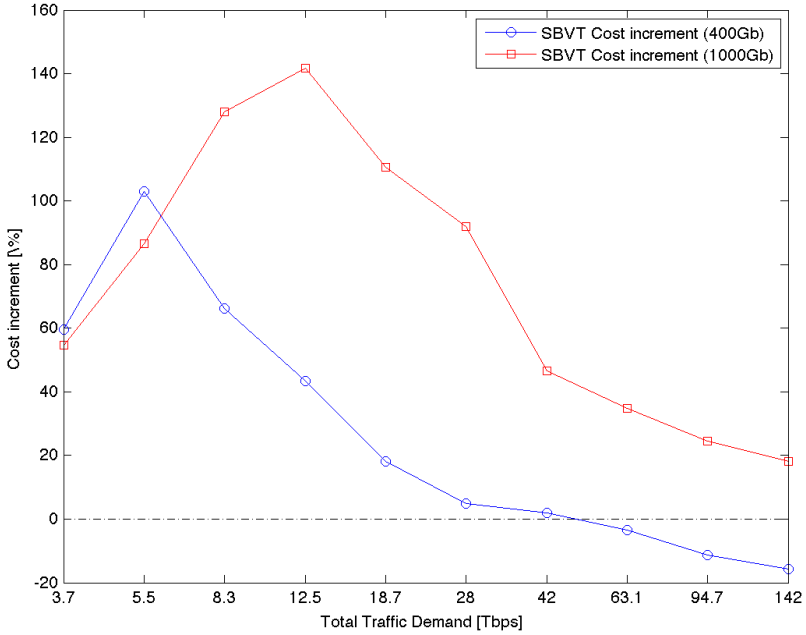
- Core reference network:
  - Based on TID reference core network.
  - Fully meshed topology with 20 nodes: 14 of transit, 6 of Interconnection.



Preliminary results – Target cost

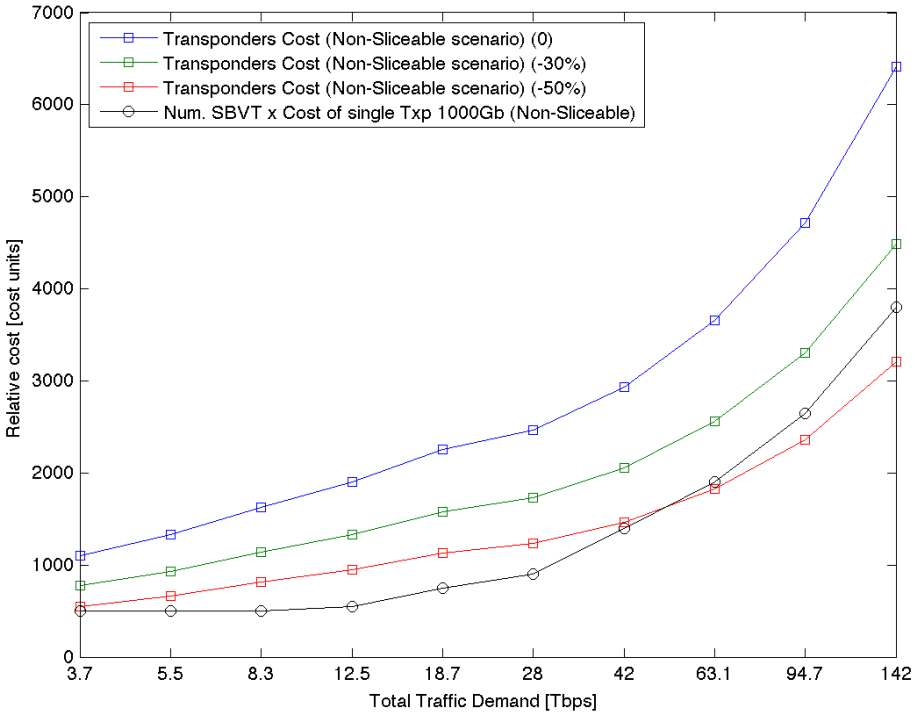
- This figure shows the target cost of the SBVT to achieve a **30% savings in the transponder cost**.
- When **SBVT** can be **more expensive** for **1Tb** will be in three years (**2015** or for a total traffic demand of 12.5Tbps) while for **400Gb** will be in **2013** (or for 5.5Tbps).
- Let us remark that in 5-6 years the cost of the 400Gb SBVT should be similar to the cost of a fixed grid transponder to achieve a 30% savings. When this price is decreasing migration to 1Tbps is reasonable.





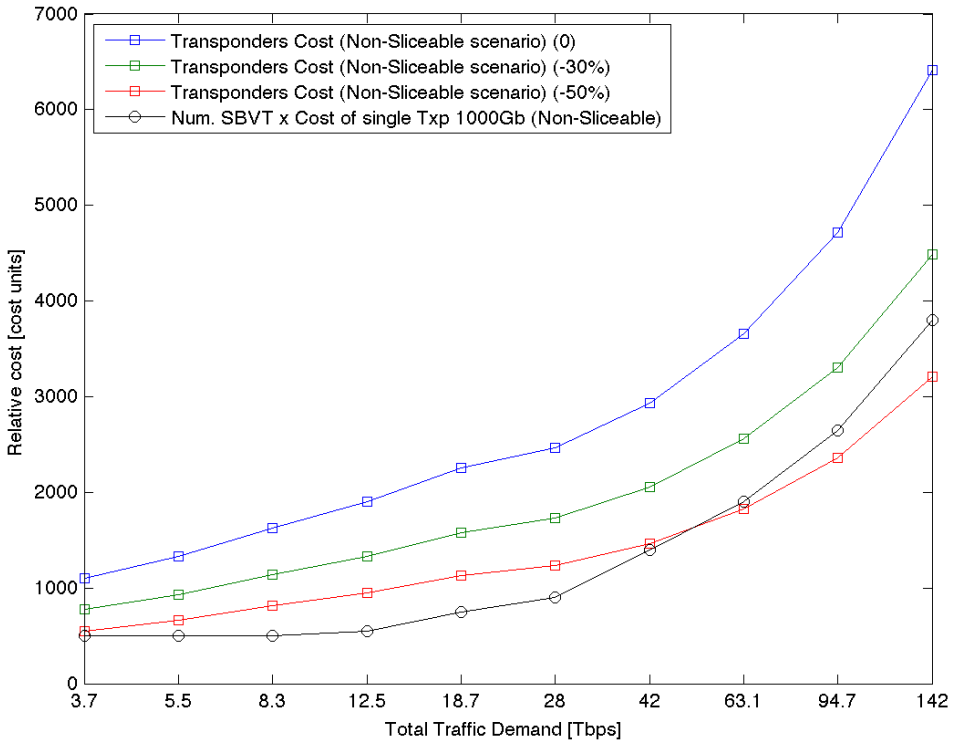
Results for 400Gbps SBVT

- This figure shows transponder cost in the case of fixed grid (50Ghz) without any saving (0), with 30% savings and 50% savings.
- Moreover, we have included the number of SBVT multiplied by the cost of a fixed grid transponder to have a lower limit cost.
- All savings are not possible in all scenario.
- In this case, 30% savings are not possible with all traffic matrices.



Results for 1Tbps SBVT

- With a 1Tb SBVT, 30% savings can be achieved in the next 9 years with a target price higher than the cost of a fixed-grid 1Tb transponder



Conclusion and outlook

- SBVT enables transmitting from one point to multiple destinations.
  - No commercial implementations, but some architectures show its feasibility.
- In this paper we present results of the target cost of 400 Gb/s and 1 Tb/s Sliceable Bandwidth Variable Transponders to reduce in a 30% transponders cost in a core network scenario.
- Savings of 30% in transponder cost are possible using 400Gb/s and 1Tb/s interfaces.
  - With a 1Tb SBVT, 30% savings can be achieved in the next 9 years
- Once transponder layer is evaluated, architecture interfacing client network elements will be evaluated in future work.

