

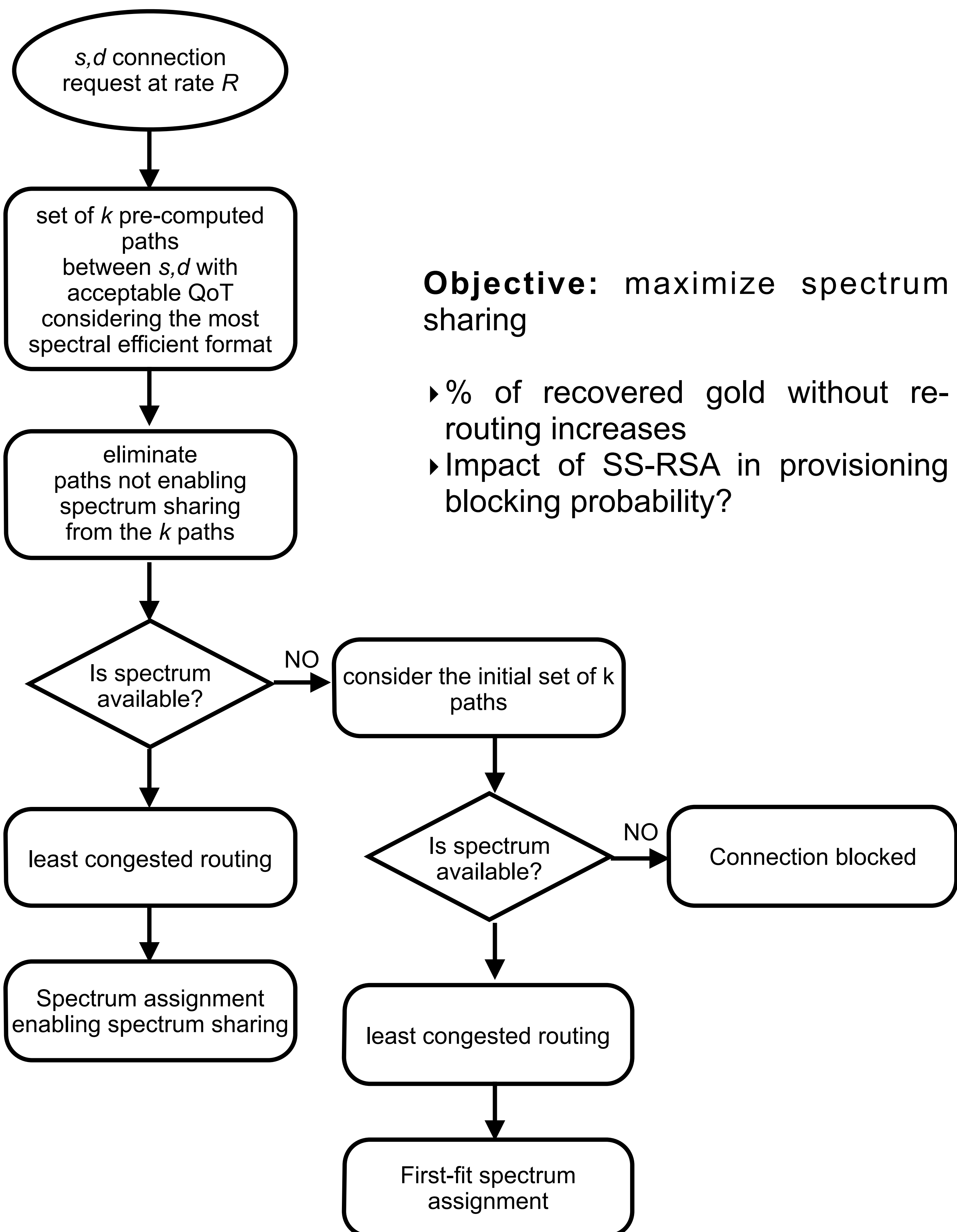
SCENARIO

- Elastic optical network (EON)
- Transmission parameter optimization (e.g., modulation format, forward error correction – FEC) depending on the path
- Soft failures can occur: i.e., change of physical parameter conditions (implying bit error rate — BER — increase)
- Transmission parameter adaptation upon soft failure: e.g., readapt FEC or modulation format to make more robust the transmission
- Different service classes:
 - gold traffic: overall bit rate has to be maintained upon failure
 - bronze traffic: overall bit rate can be downgraded upon soft failure

CONTRIBUTIONS

- Proposal of **spectrum sharing** between gold and bronze adjacent lightpaths
 - Normal conditions: full bit rate for both gold and bronze; shared spectrum used by bronze
 - Soft failure: shared spectrum reconfigured for the gold → gold kept at full bit rate, bronze downgraded to lower bit rate
- Proposal of a routing and spectrum assignment (RSA) algorithm to maximize the spectrum sharing

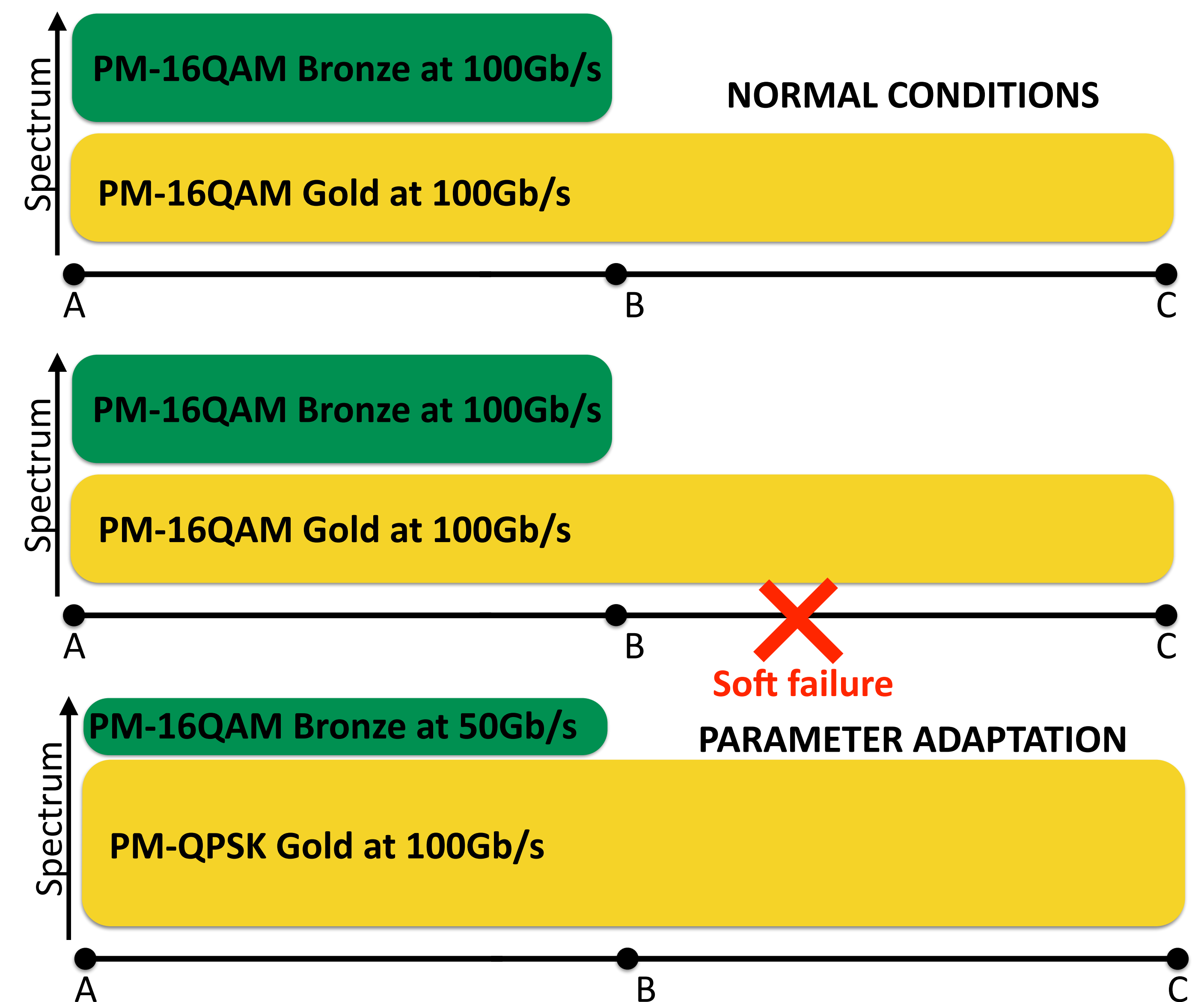
SHARING-SPECTRUM-BASED RSA (SS-RSA)



ISSUES

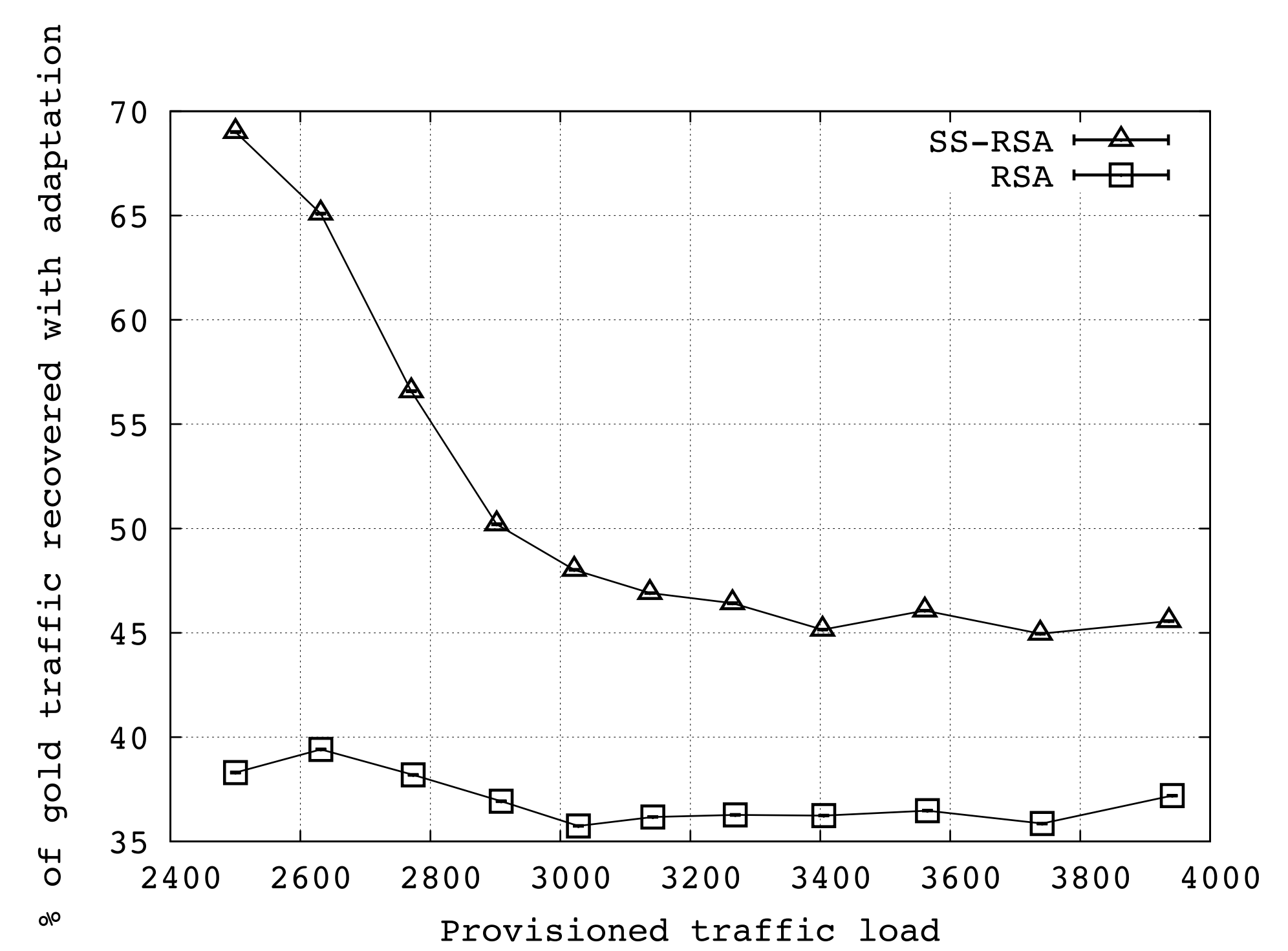
- Modulation format and FEC adaptations are limited by bandwidth constraints
 - e.g., fixing the baudrate, adapting from PM-16QAM to PM-QPSK, bit rate is reduced → new sub-carrier/lightpath (more bandwidth) to keep initial bit rate
- Adaptation to a more robust transmission requires the availability of extra bandwidth to maintain a given bit rate

SPECTRUM SHARING

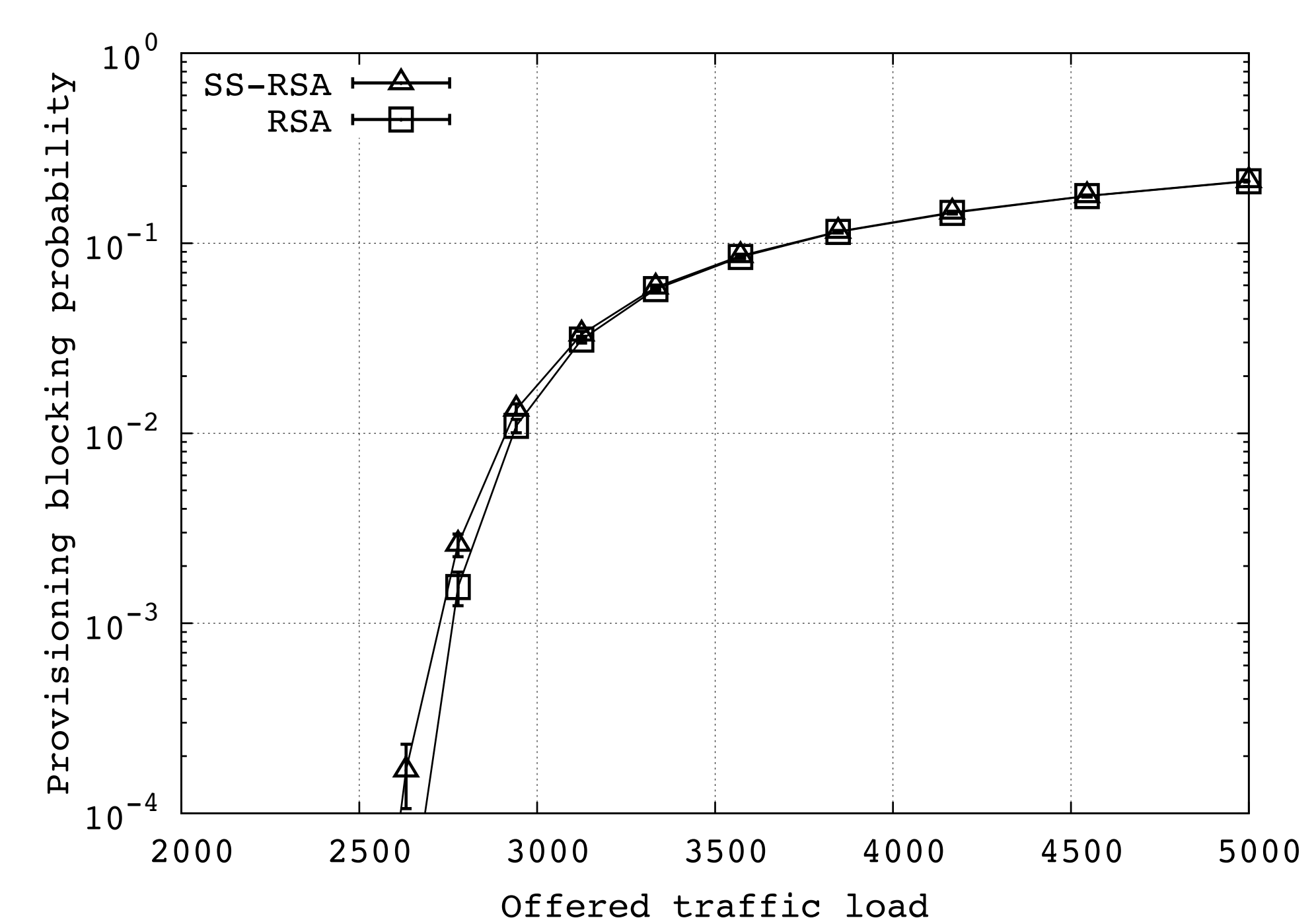


SIMULATIONS

- Spanish network
- Transceivers supporting PM-16QAM, PM-QPSK, and PM-BPSK
- 100Gb/s gold and bronze
- Poisson process
- k paths composed of all the paths within one hop from the shortest hop path



- Even with simple RSA up to 40% of gold traffic recovered by adapting transmission parameters
- With SS-RSA up to 70% of gold traffic recovered through adaptation



- SS-RSA does not negatively impact provisioning blocking probability

CONCLUSIONS

- Spectrum sharing permits to recover [35,75]% of high-priority (gold) traffic without re-routing
- The proposed SS-RSA maximizes spectrum sharing, thus the number of recovered high-priority (gold) lightpaths without re-routing (75%) and without affecting provisioning blocking probability

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