

Discovery Slot Size

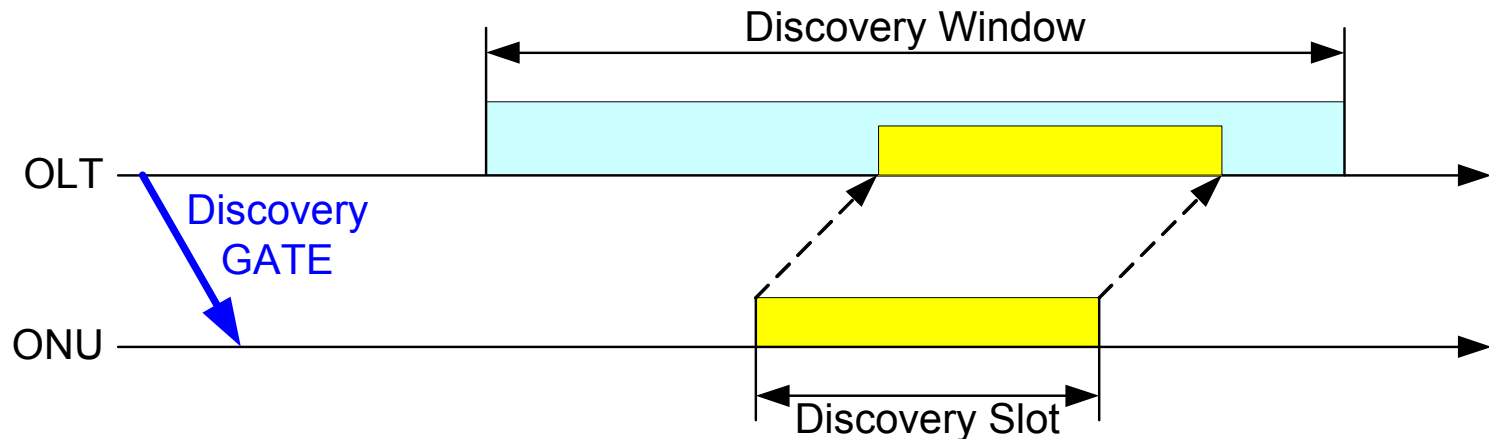
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Definitions

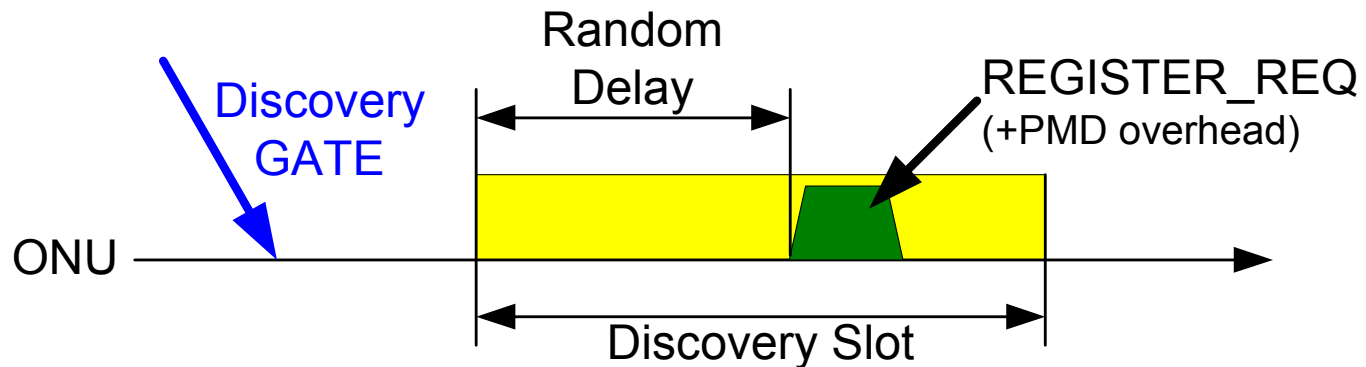
- **Discovery Slot**
 - slot length value sent in Discovery GATE
- **Extended Guard Band**
 - additional guard band allocated by the scheduler to absorb unknown RTT (200 μ s for 20 km max distance)
- **Discovery Window**
 - transmission window used for discovery (i.e., not available to normal traffic)

Discovery Window = Discovery Slot + Extended Guard Band



Contention Resolution Mechanism

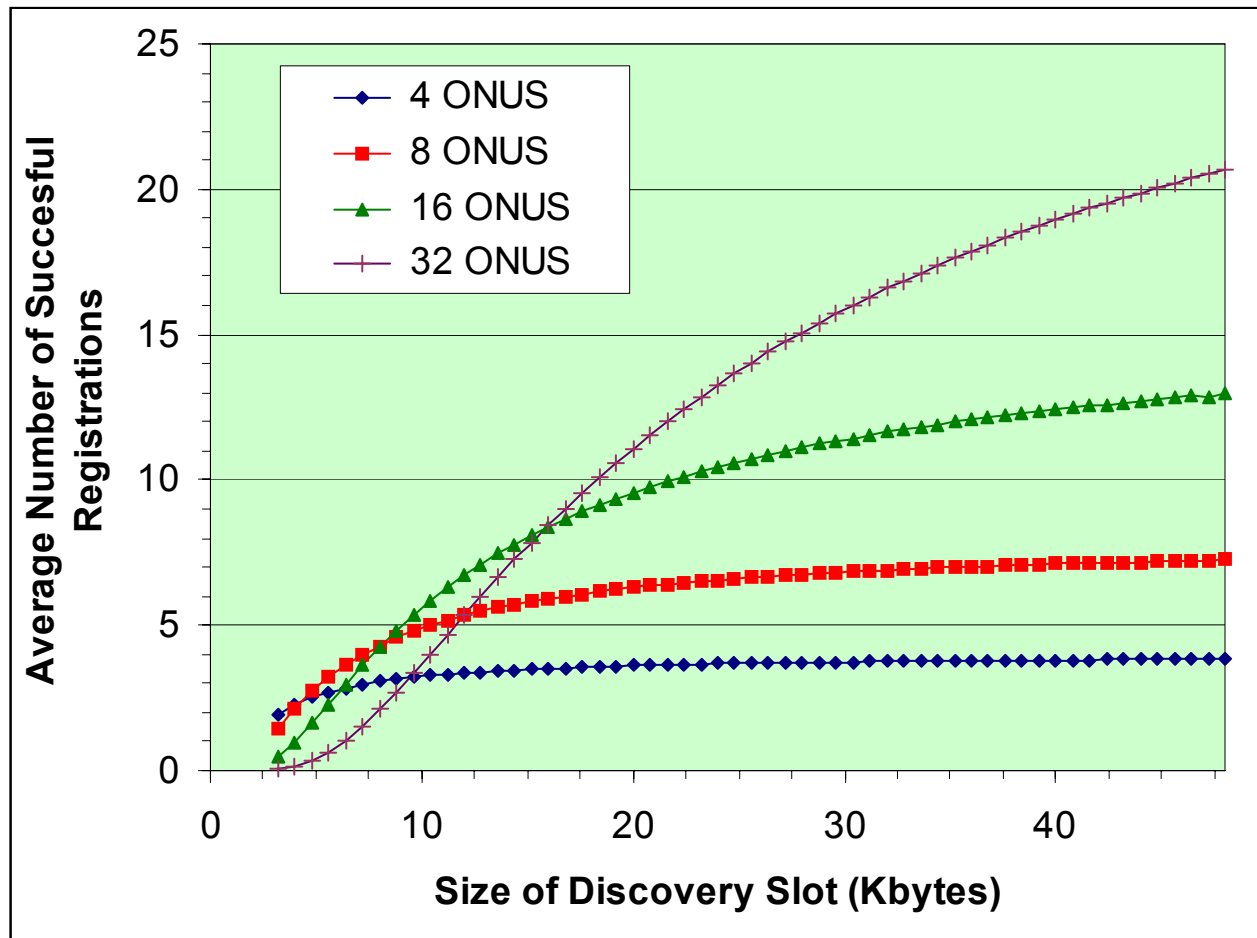
- Random Delay
 - ONU applies random delay before transmitting REGISTER_REQ



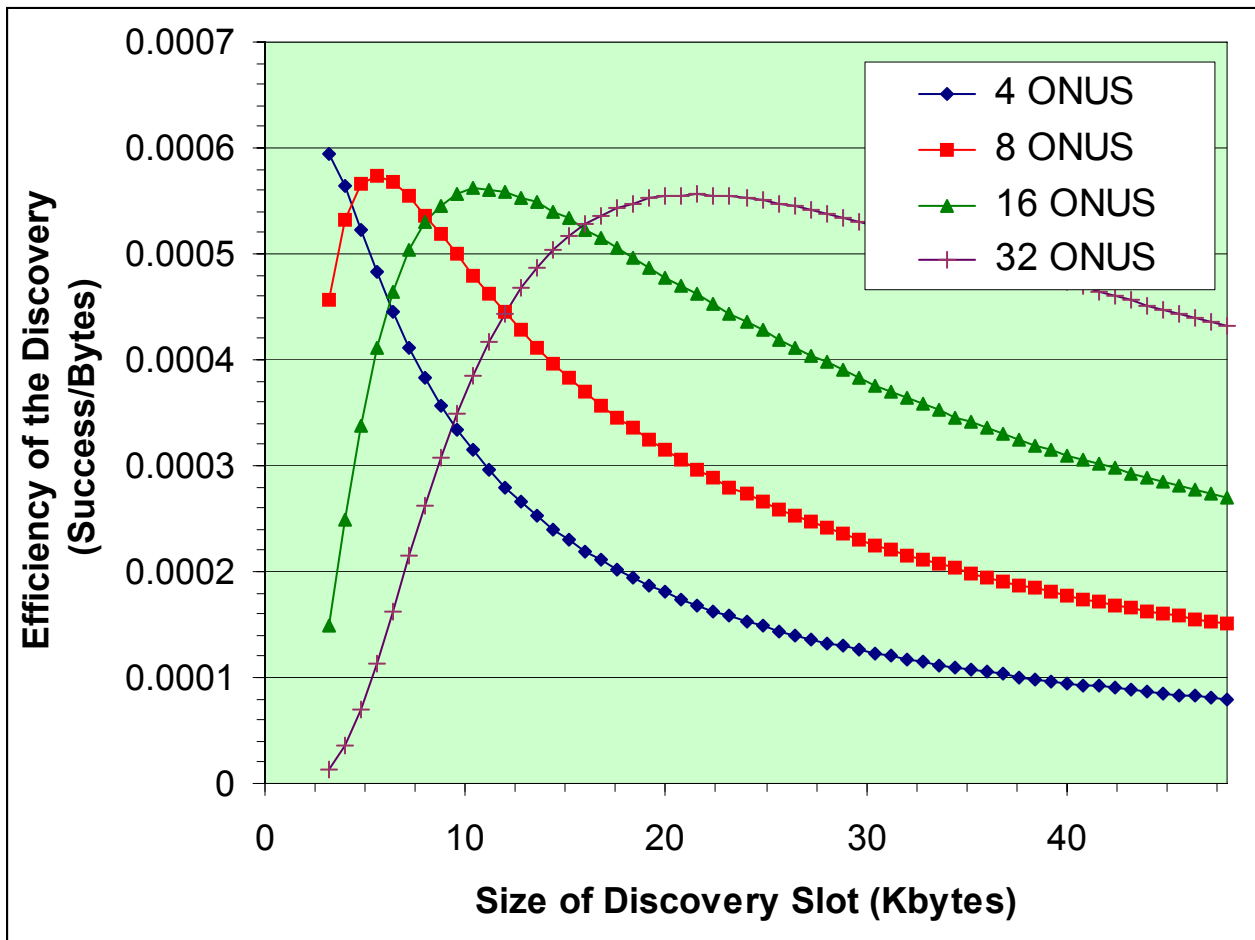
Simulation Parameters

- Number of contending ONUs varies from 1 to 32
- RTTs are fixed at 200 μs (20 km distance)
- PMD Overhead (Laser_ON + CDR + AGC + Laser_OFF) = 2 μs
- Extended Guard Band = 200 μs

Successful Registrations in one Attempt



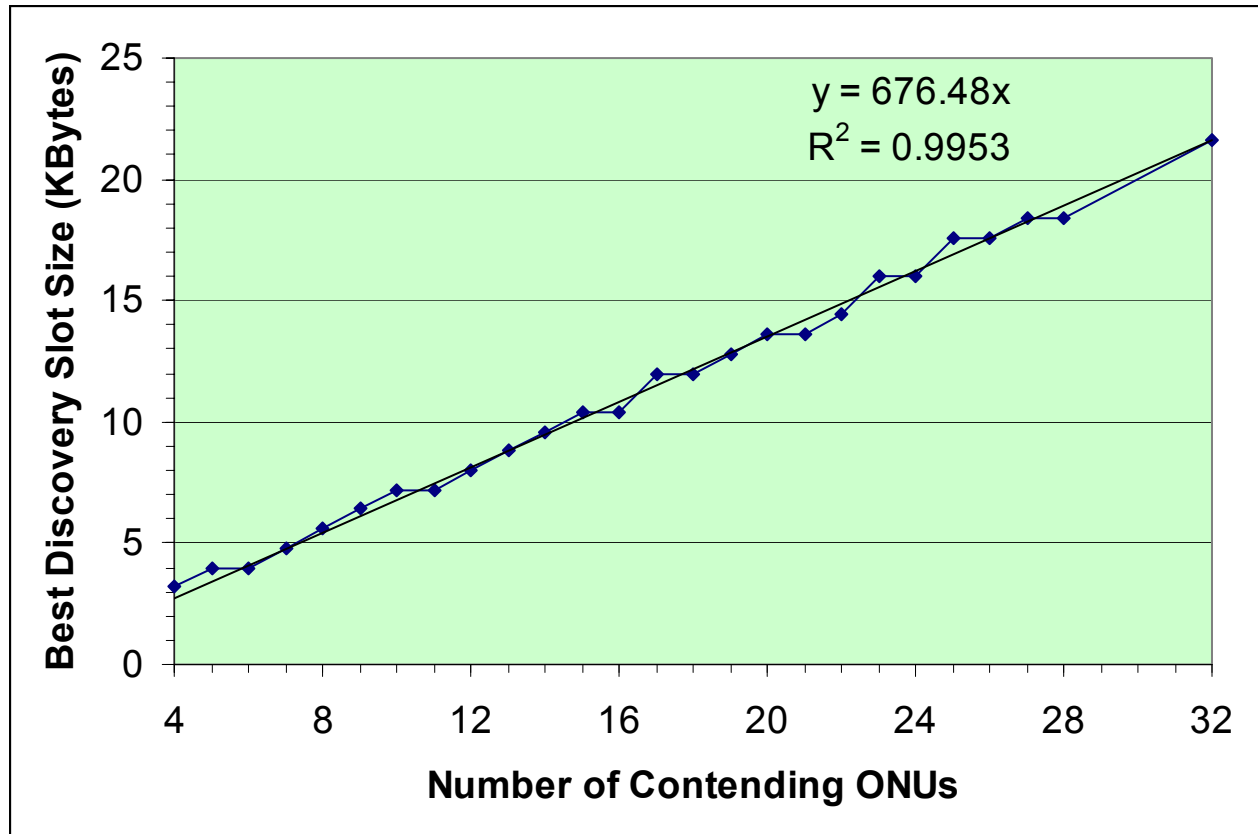
Efficiency of the Discovery Slot



Efficiency function = number_of_successes / slot_size

Efficiency function has a maximum

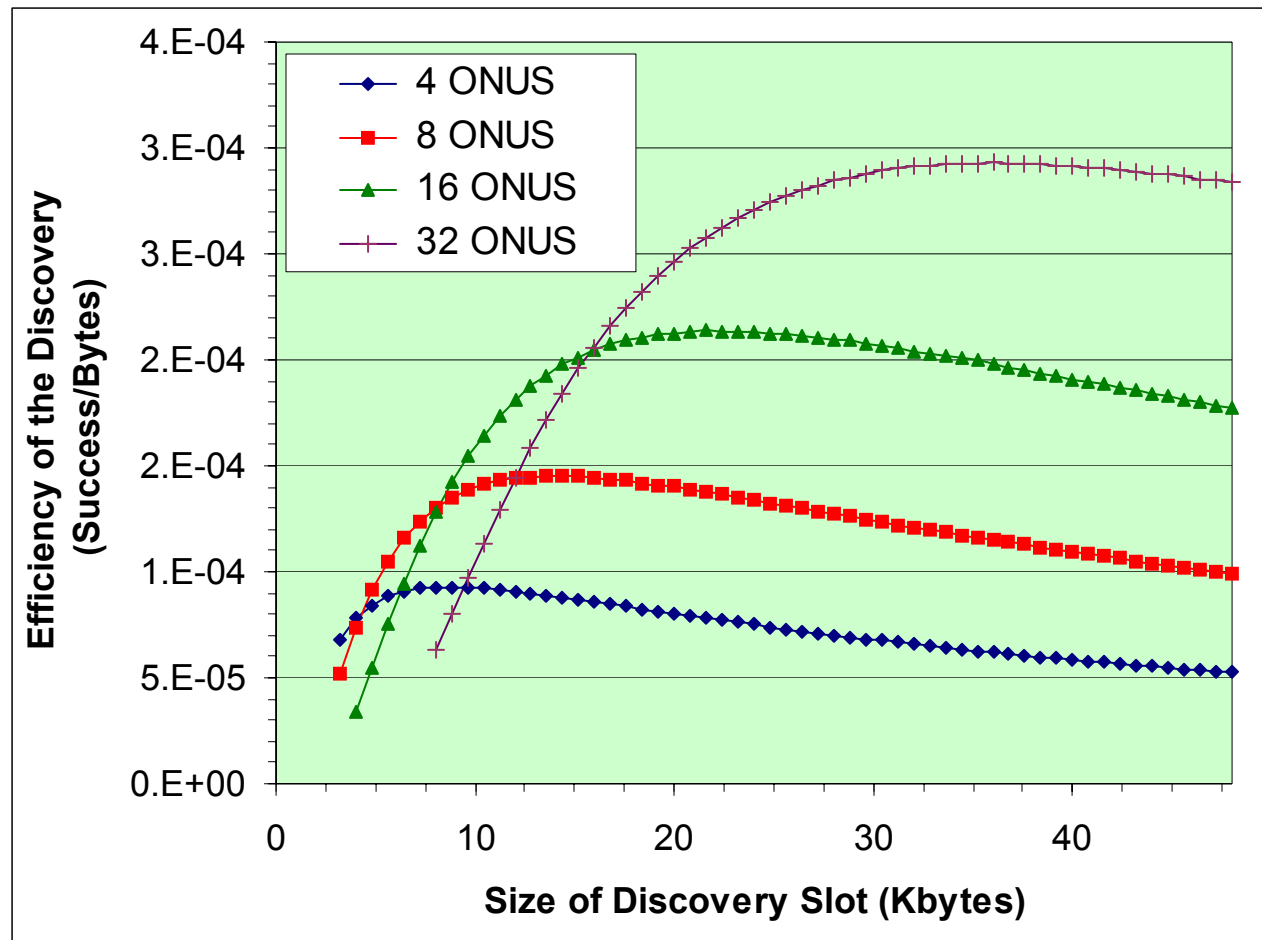
Best Discovery Slot Size



Transmission size of one ONU = 64 + 20 + 250 (OH) = 334 bytes

Best Slot Size = 2 × contending_ONUs × transmission_size

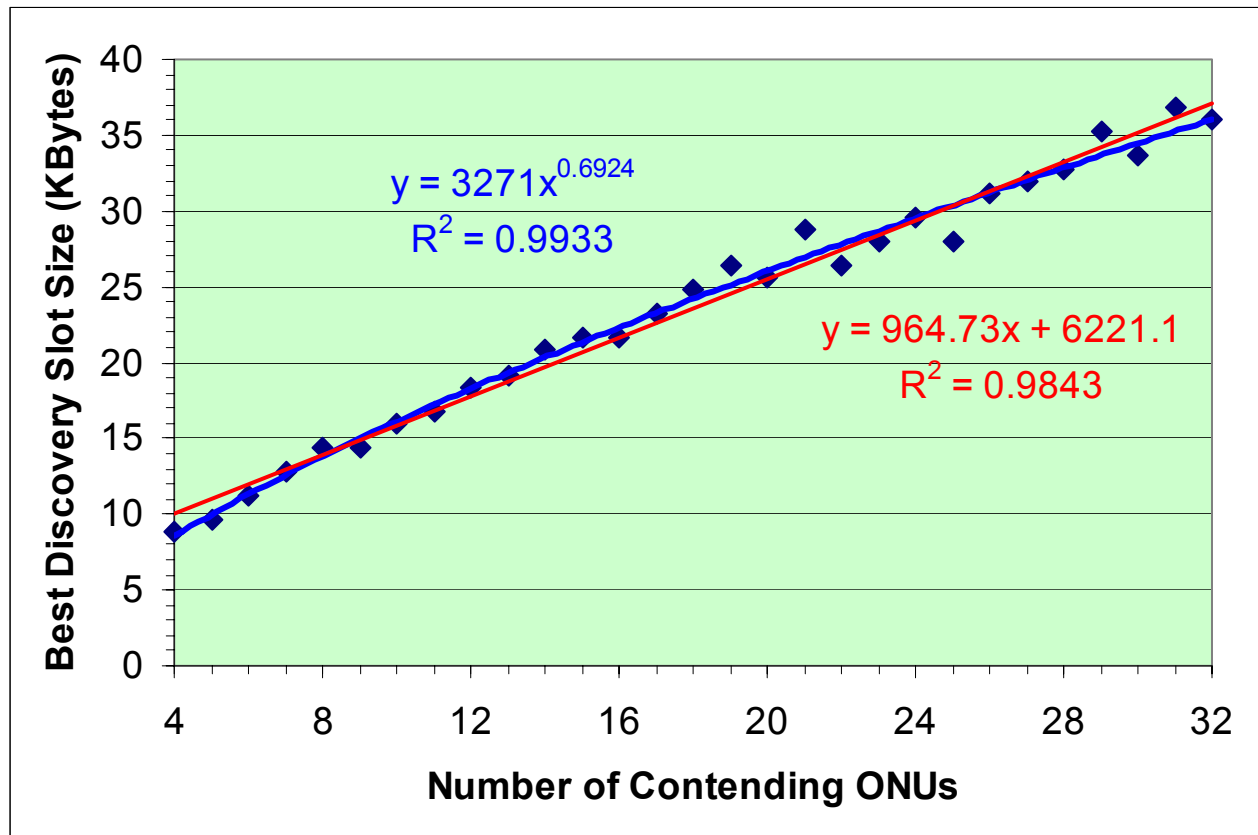
Efficiency of the Discovery Window



Efficiency function = number_of_successes / wondow_size

Efficiency function has a maximum

Best Discovery Window Size



Transmission size of one ONU = 64 + 20 + 250 (OH) = 334 bytes

Best Slot Size is a function of a number of contending ONUs

Conclusion

- Most efficient discovery slot size is dependent on the number of contending ONUs (simple function or table)
- OLT can estimate the number of contending ONUs since it knows the number of **total connected ONUs** and the number of **active ONUs**
- **Discovery Slot size can be made dynamic**