



Discovery Process for EPON

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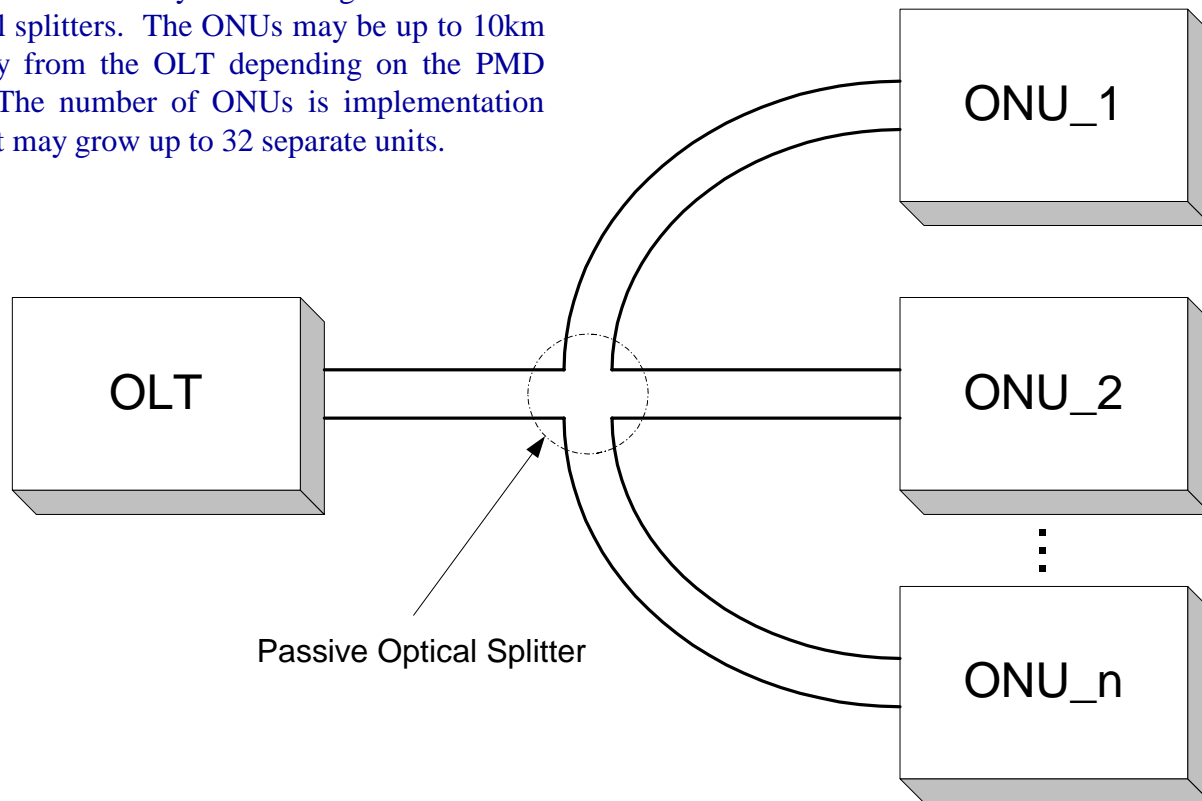
Discovery Process

- Step 1 – OLT sends GATE message to all ONUs
 - Announces when discovery window will open
- Step 2 – ONU sends REGISTER_REQ to OLT
 - ONU tells OLT what pending grants it has
- Step 3 – OLT sends REGISTER to individual ONU
 - Assigns LLID to ONU
- Step 4 – OLT gives ONU its initial grant
- Step 5 – ONU sends REGISTER_ACK to OLT
 - Echo of unique LLID and Sync Time
- Step 6 – Registration is completed

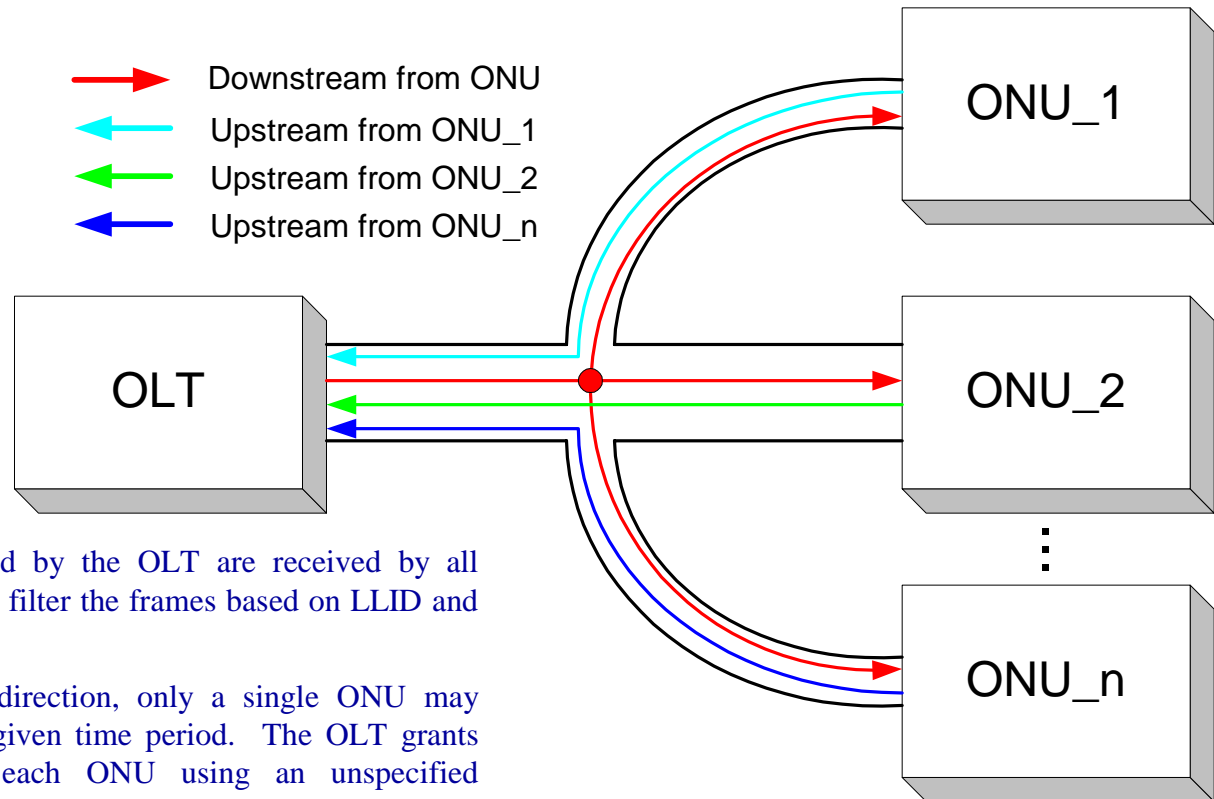


EPON Architecture

- Multiple architectures may exist using one or more passive optical splitters. The ONUs may be up to 10km or 20km away from the OLT depending on the PMD being used. The number of ONUs is implementation dependent, but may grow up to 32 separate units.



Traffic Directionality

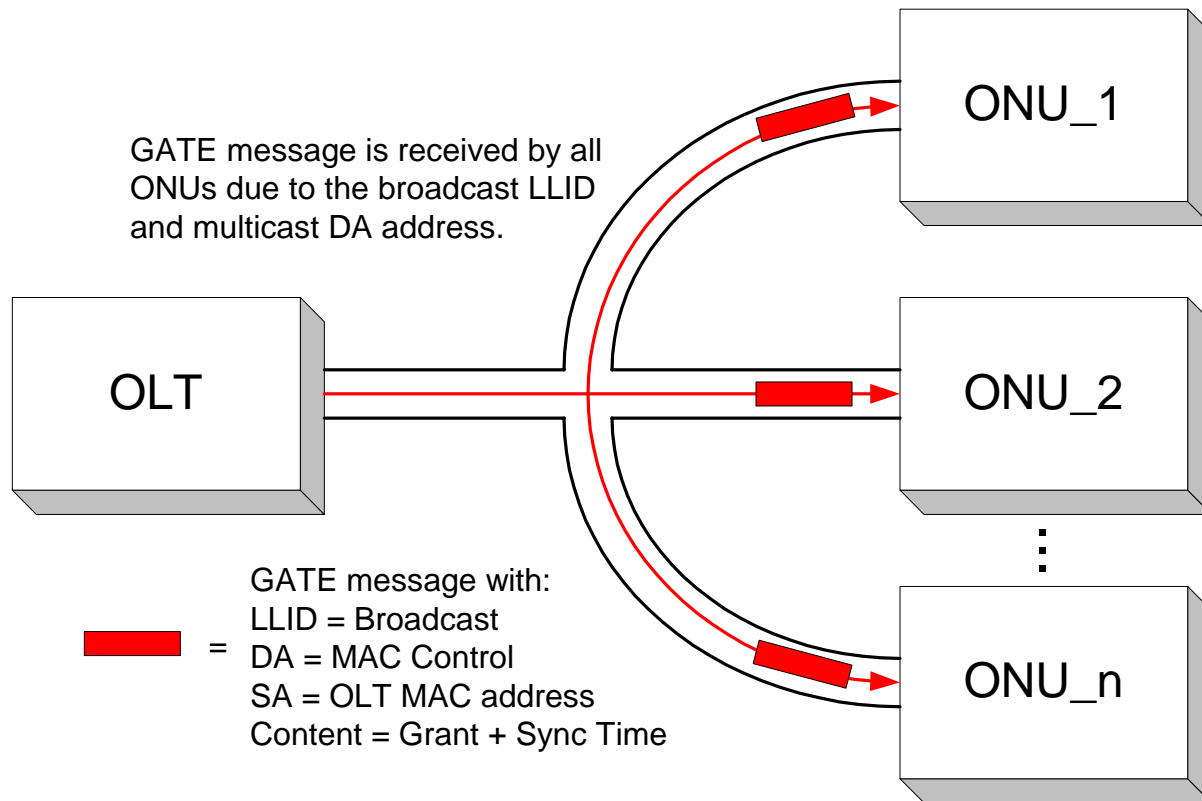


- Frames transmitted by the OLT are received by all ONUs. The ONUs filter the frames based on LLID and MAC address.

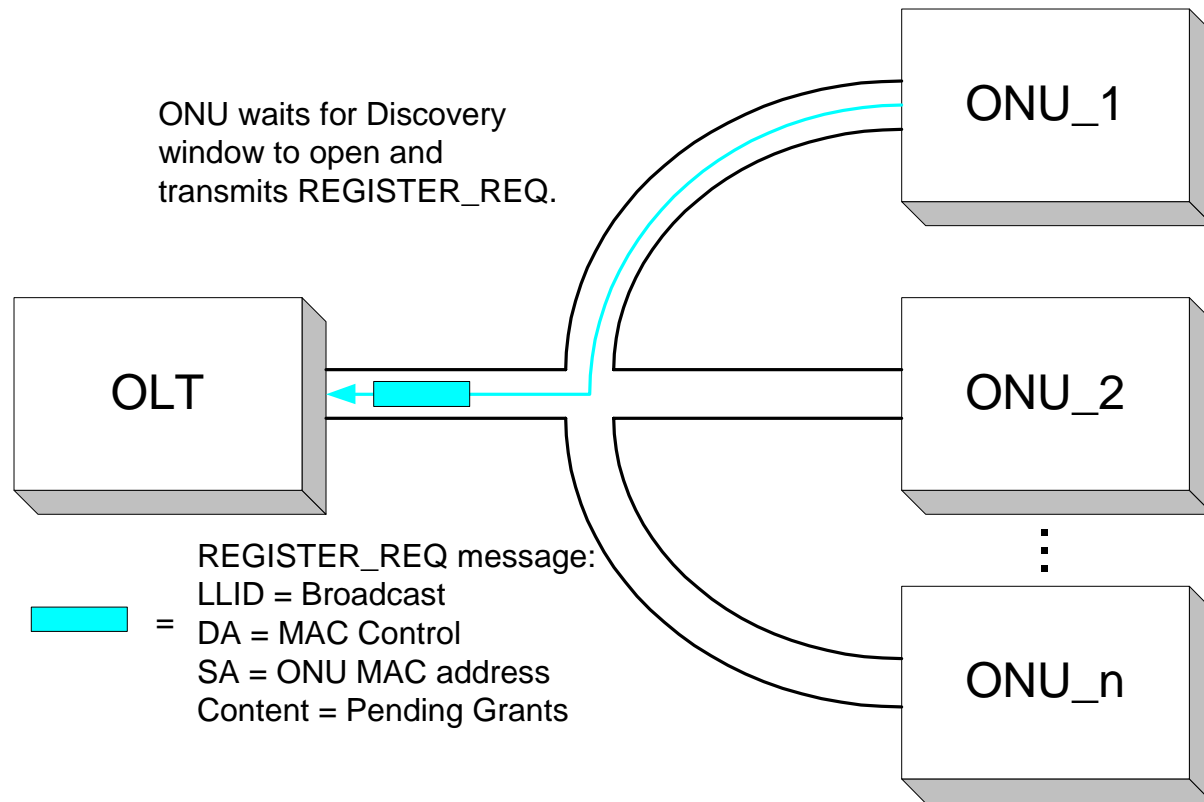
- In the upstream direction, only a single ONU may transmit during a given time period. The OLT grants time periods to each ONU using an unspecified bandwidth allocation algorithm.

- Although multiple colors are used in this diagram, all downstream traffic is on one wavelength and all upstream traffic is on a second wavelength.

Step 1: OLT sends GATE

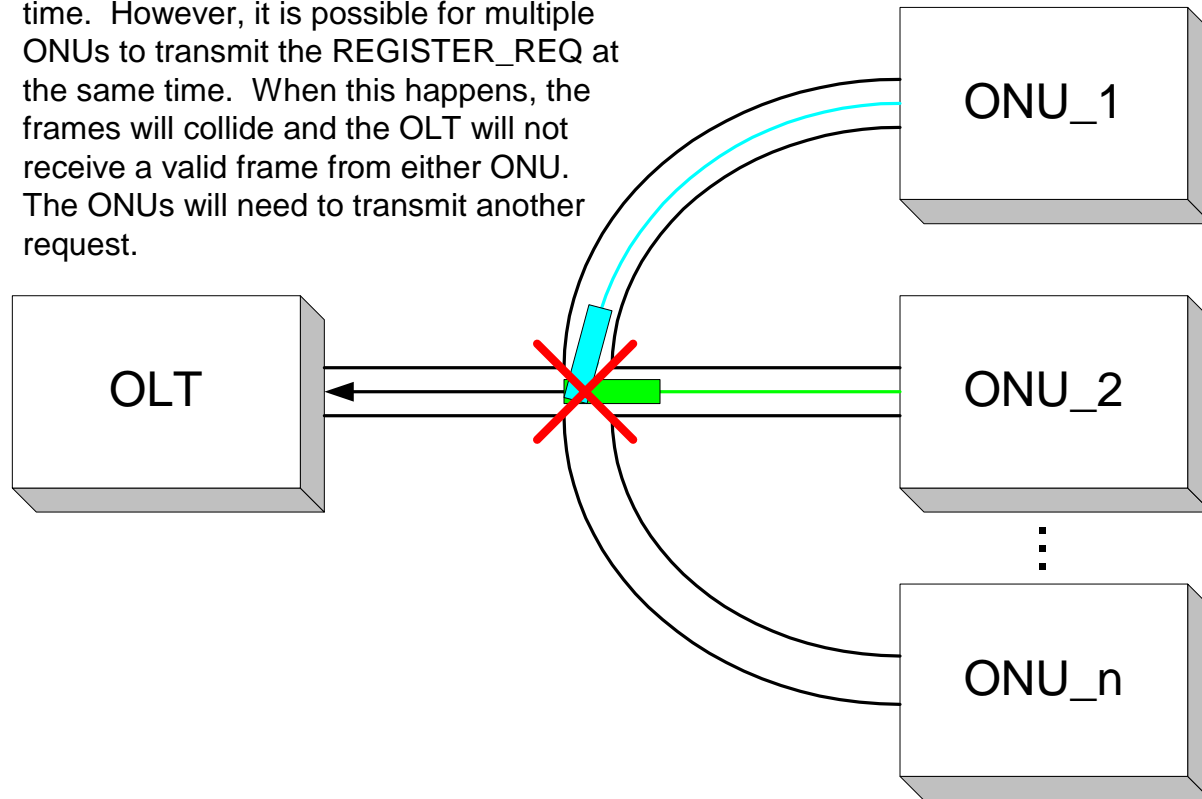


Step 2: ONU transmits REGISTER_REQ message

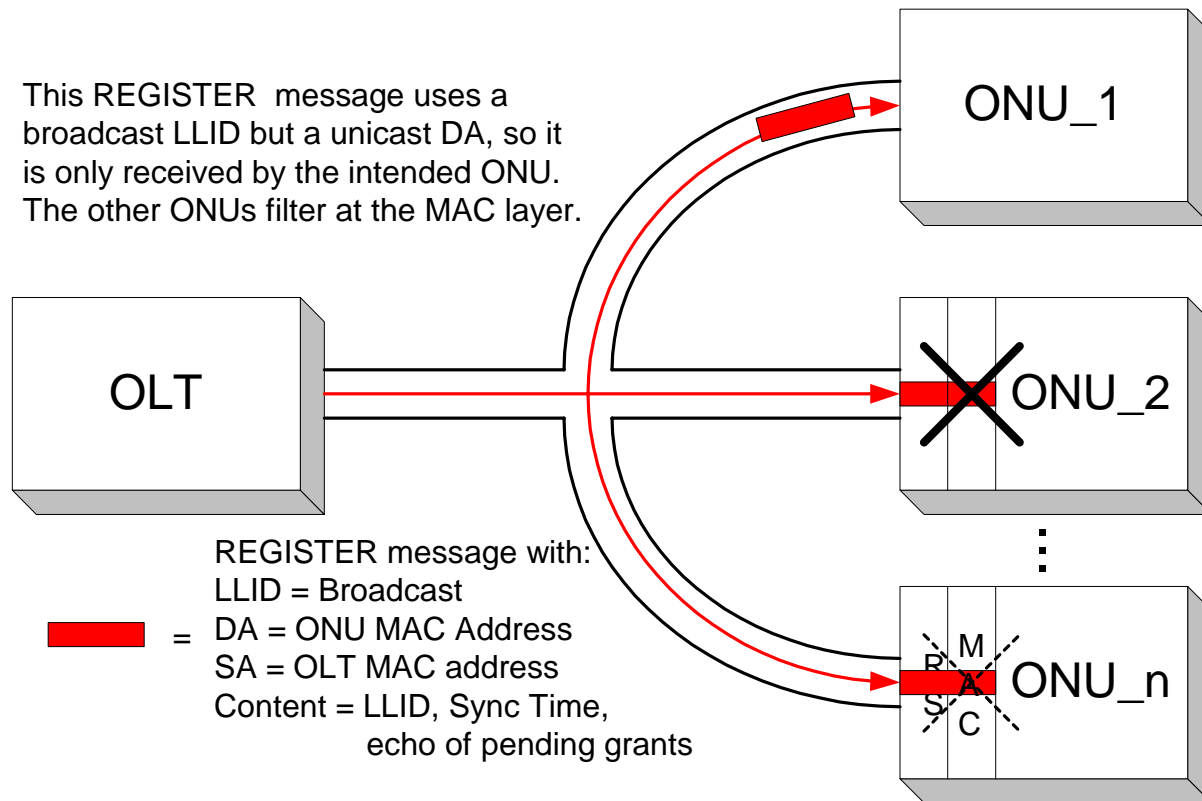


Step 2: ONU Collisions

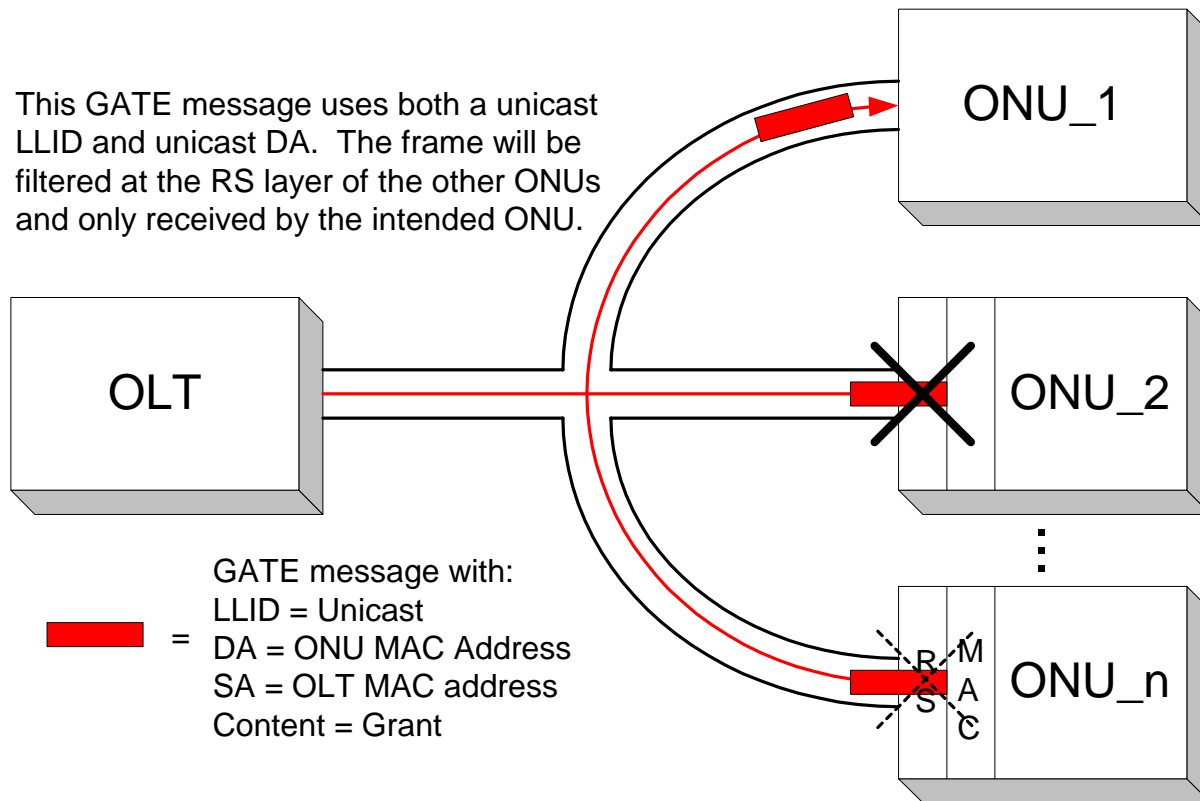
Before transmitting the REGISTER_REQ, each ONU waits for a random amount of time. However, it is possible for multiple ONUs to transmit the REGISTER_REQ at the same time. When this happens, the frames will collide and the OLT will not receive a valid frame from either ONU. The ONUs will need to transmit another request.



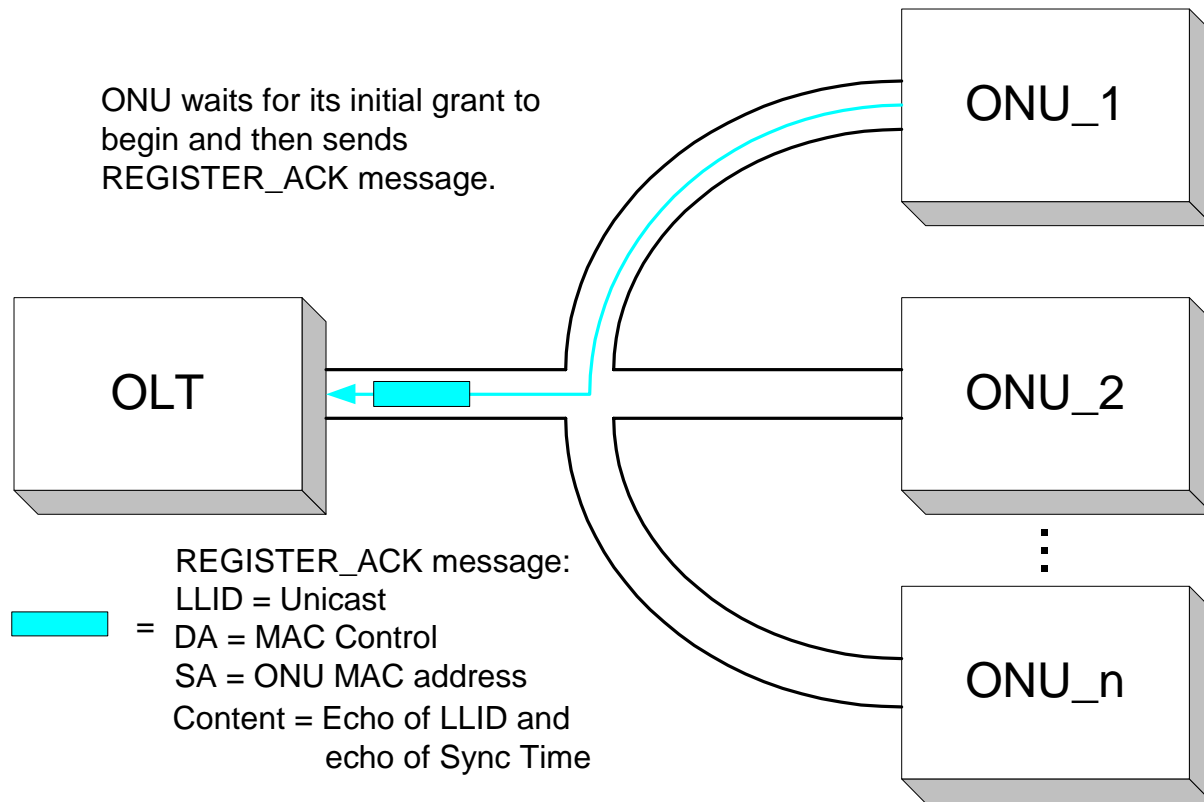
Step 3: OLT sends REGISTER



Step 4: Initial GATE to ONU



Step 5: ONU REGISTER_ACK



Step 6: Normal Operation

