

# Consideration for Power-Saving functionality

**March 18-20, 2008**  
**IEEE 802 Plenary Meeting, Orlando, FL**  
Yasuyuki Kuroda  
OF Networks Co., Ltd.

## > **Necessity of the Power-Saving ;**

Recently, a serious problem occurs by global warming.

It destroys the ecosystem, and causes abnormal weather.

( Temperature increase Year 2000 to 2100 ; from +1.1 to +6.4 degrees C\* )

Therefore, counter measures against global warming are necessary in each industry such as energy, consumer electronics, telecom equipment and so on.

Power-Saving is one of the important counter measures.

\*Source : IPCC 2007. NOTE : WG1-AR4.

## > **Necessity of the Power-Saving in the telecom industry ;**

In the telecom industry, the communication traffic increases rapidly.

It causes increment of power consumption per equipment.

In household, large number of installation of consumer equipments such as ONU, HGW, and STB will be expected.

So Power-Saving of telecom equipment is very important.

## > **Power-Saving from the view point of Telecom Industry ;**

- Constructing low power and efficient networks  
( Installing new lower power equipments, and so on )
- Developing lower power telecom equipments  
( Circuit technology, Low power device development, and so on )
- Educational activity for consumer's mind change  
(Turn equipments off when not in use, and so on )

## > **And one of the important things ;**

- **Standardization should also contribute to Power-Saving**

# What we can contribute for Power-Saving



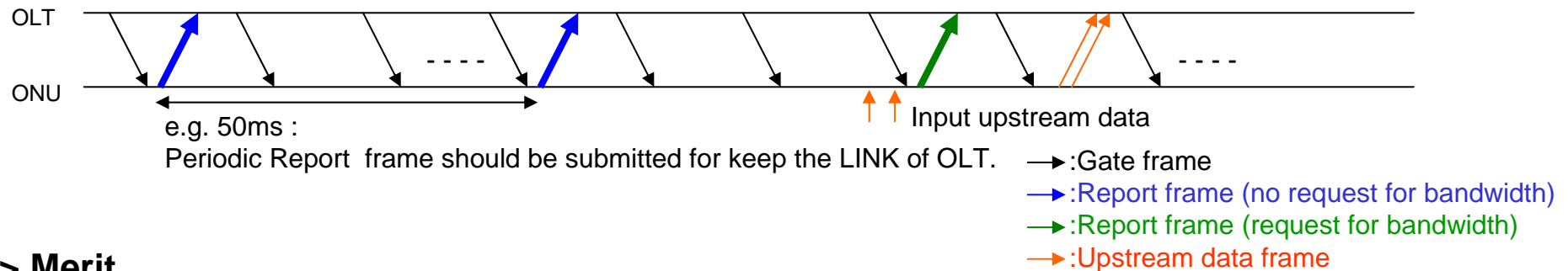
## > Reduction of number of Report frame transmit

### [ Current Operation ]

In Clause 93, it has not been described that number of transmission of Report frame other than Periodic Report frame ( condition of 50ms intervals ).

### [ Reduction of numbers of Report frame transmit ]

- If upstream data does not exist at ONU, only minimum number of Periodic Report frame should be submitted for keep the LINK of OLT.
- If the upstream data exist at ONU, Report frames are submitted normally.



## > Merit

- Save power consumption of basic devices such as optical transceivers, SERDES, and MAC LSI on both OLT and ONU

## > Note

- No impact with delay and throughput of the upstream transmit
- There might be some impact if current OLT implementation requires report frame per every submitted Gate frame.

An example of functional changes which contributes for emerging Telecom Power Saving issues was studied.

- > Concept of reduction of numbers of Report frame transmit saves power consumption of optical transceivers, SERDES, and MAC LSI on both OLT and ONU
- > There may be small impact on current Clause 93.

< Discussion >

- > For 10G application, Additional description to Clause 93 needs to be discussed.
- > Possibility of description changes on the other Clause.
- > Other items or ideas for Power-Saving should be considered.
- > Quantitative analysis for reduction of consumption power.

### > 93.3.4 Repot Processing

Reports shall be generated periodically, even when no request for bandwidth is being made. This keeps a watchdog timer in the OLT from expiring and deregistering the ONU.

For proper operation of this mechanism the OLT shall grant the ONU periodically.

(Comment Addition)

For 10G application, if upstream data does not exist at ONU, only minimum number of Periodic Report frame are submitted for keeping the LINK of OLT. And ONU doesn't send a report frame that requires no bandwidth.

If the upstream data exist at ONU, Report frames are submitted normally.