

Eco-Architecture and Eco-Literacy on ICT for a Sustainable Society

2008-10-20

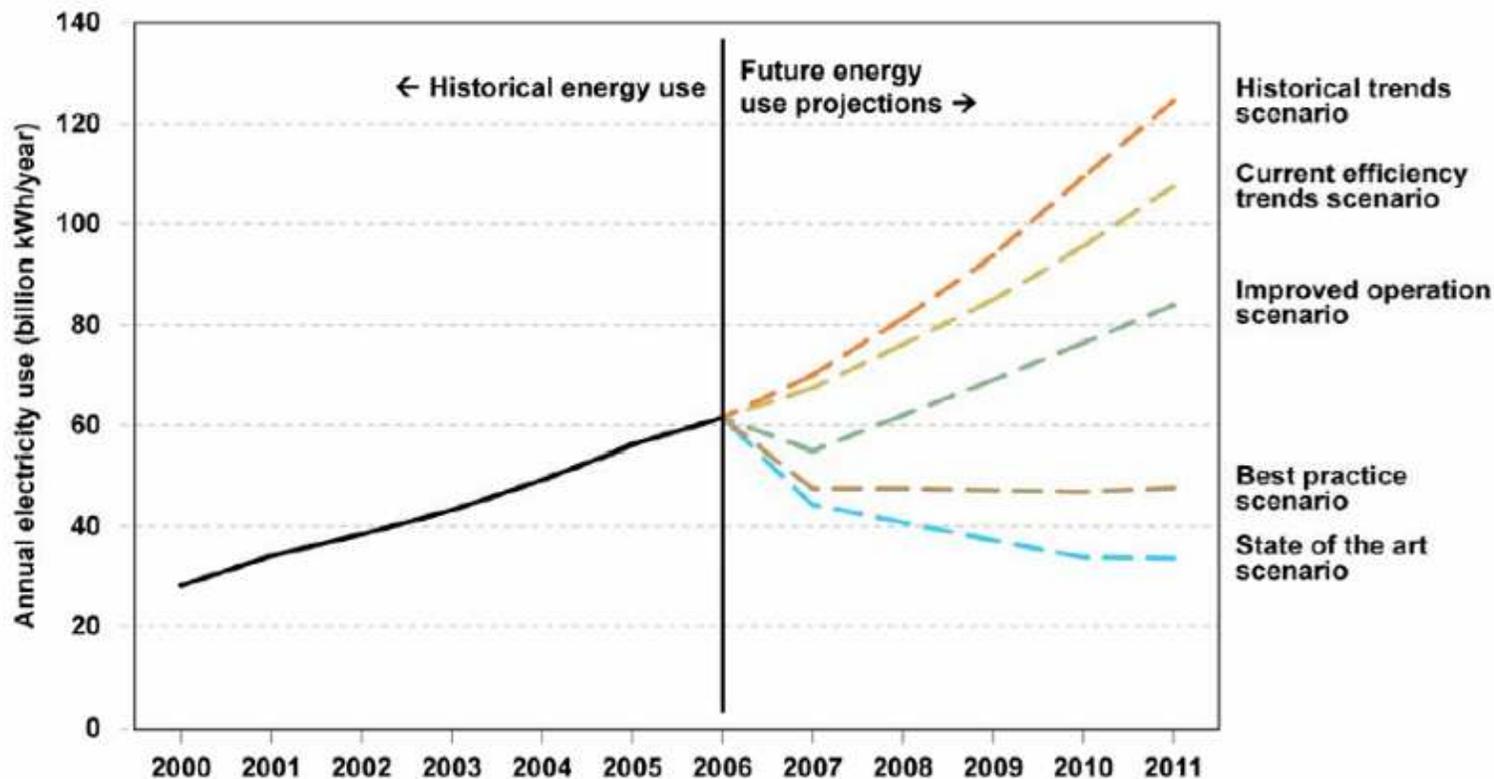
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CO₂ emission is growing by Information Explosion (1)

- U.S. Environmental Protection Agency has reported ten new power plants would be necessary just for U.S. data center by 2011.
- Contribution of ITU-T : **“Focus Group on ICTs and Climate Change”** is expected for reduction of CO₂ emission of **network centric field**

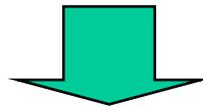
Figure ES-1. Comparison of Projected Electricity Use, All Scenarios, 2007 to 2011



[1] U.S. Environmental Protection Agency STAR Program

CO₂ emission is growing by Information Explosion (2)

- Unstructured data (Video, Audio, still-picture, e-mail, etc.) on the storage are exploding and will reach approximate 90% of data by 2011
- While 25% of data are newly created, and 75% are duplicated ones through the transferring on a network and storage.
- A 1.1-MB (100k mail +1M attached file) email message is sent to four people, 51.5-MB of data is ultimately stored



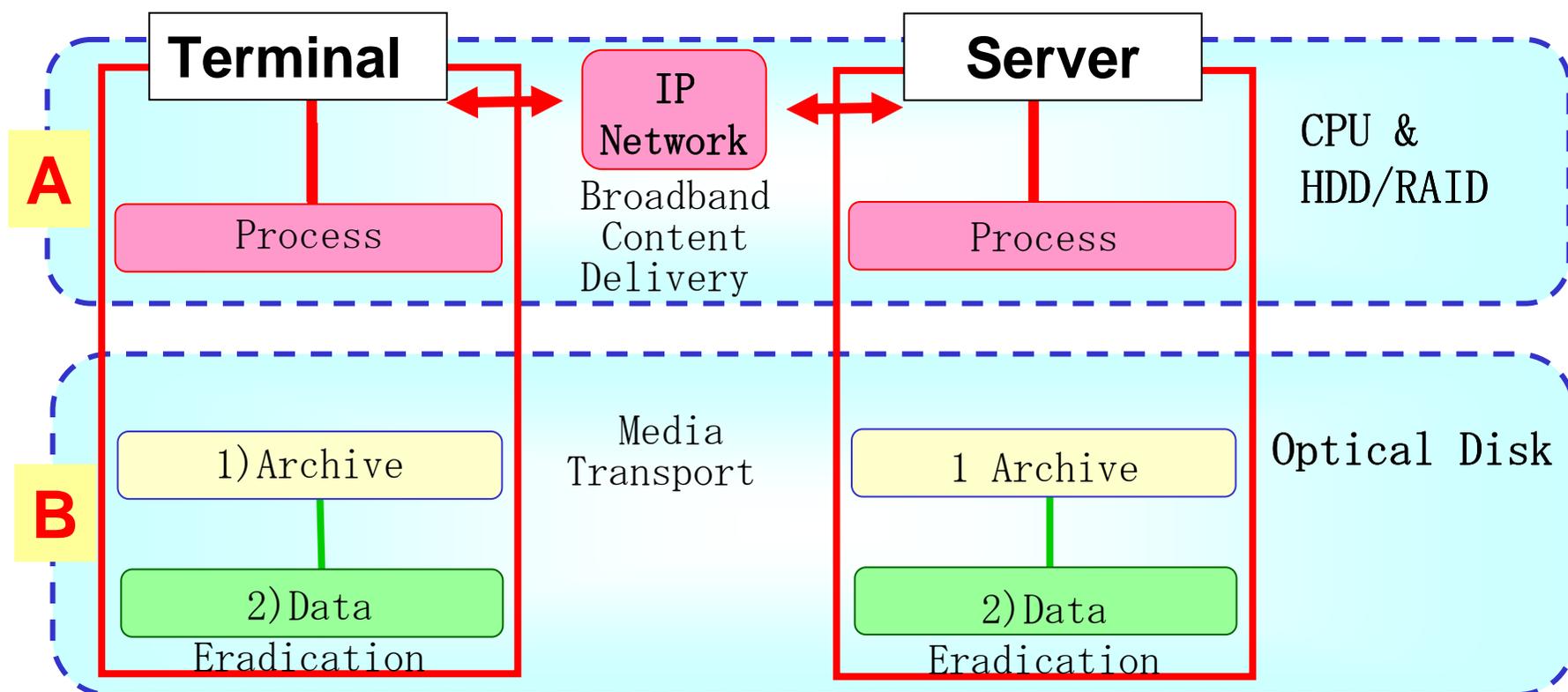
[2] [3] IDC reports

Information Memory Architecture should be applied to reduce CO₂ emission caused by Information Explosion

- 1) Utilize storage method with low CO₂ emission
- 2) Establish the rule of data eradication

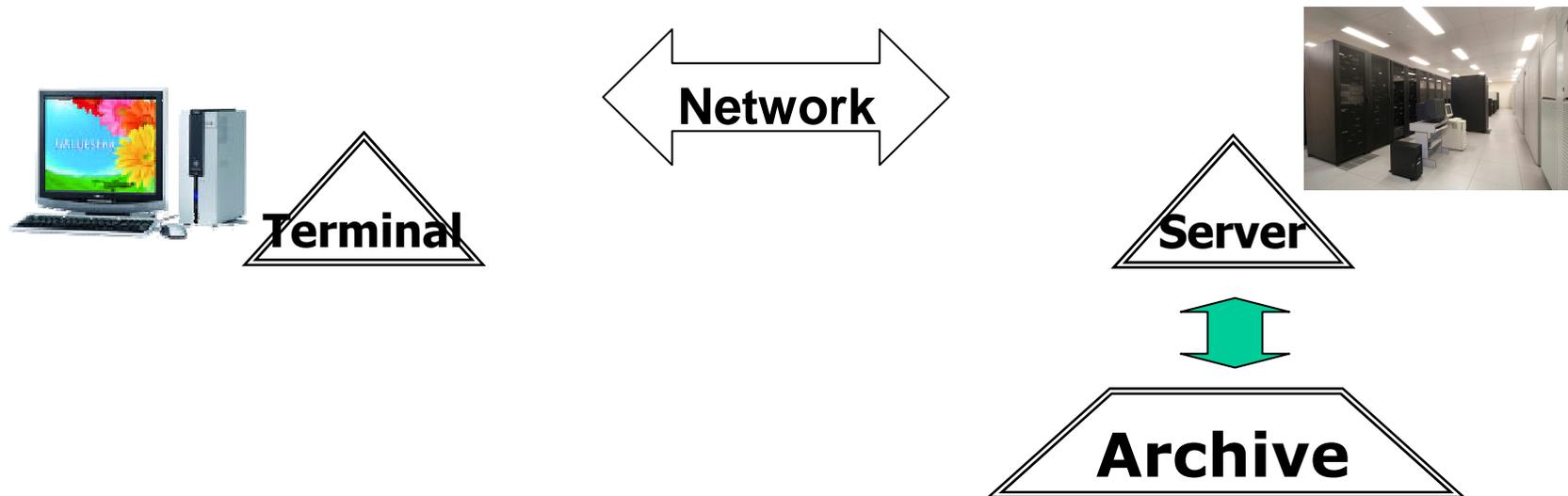
ICT Network Architecture for Reduction of CO₂

- ➔ **A** Current architecture consists of mainly by online memory systems, which are **always spinning with consuming the electricity**
<Propose to investigate>
- ➔ **B** To save investment and reduce CO₂ emission
 - **archives** by optical disk or other transportable media
 - **data eradication** should be **seriously taken into account hereafter**



Current Architecture

- Simple structure, always Online, CO₂ emission is growing
- How can we reduce CO₂ emission?

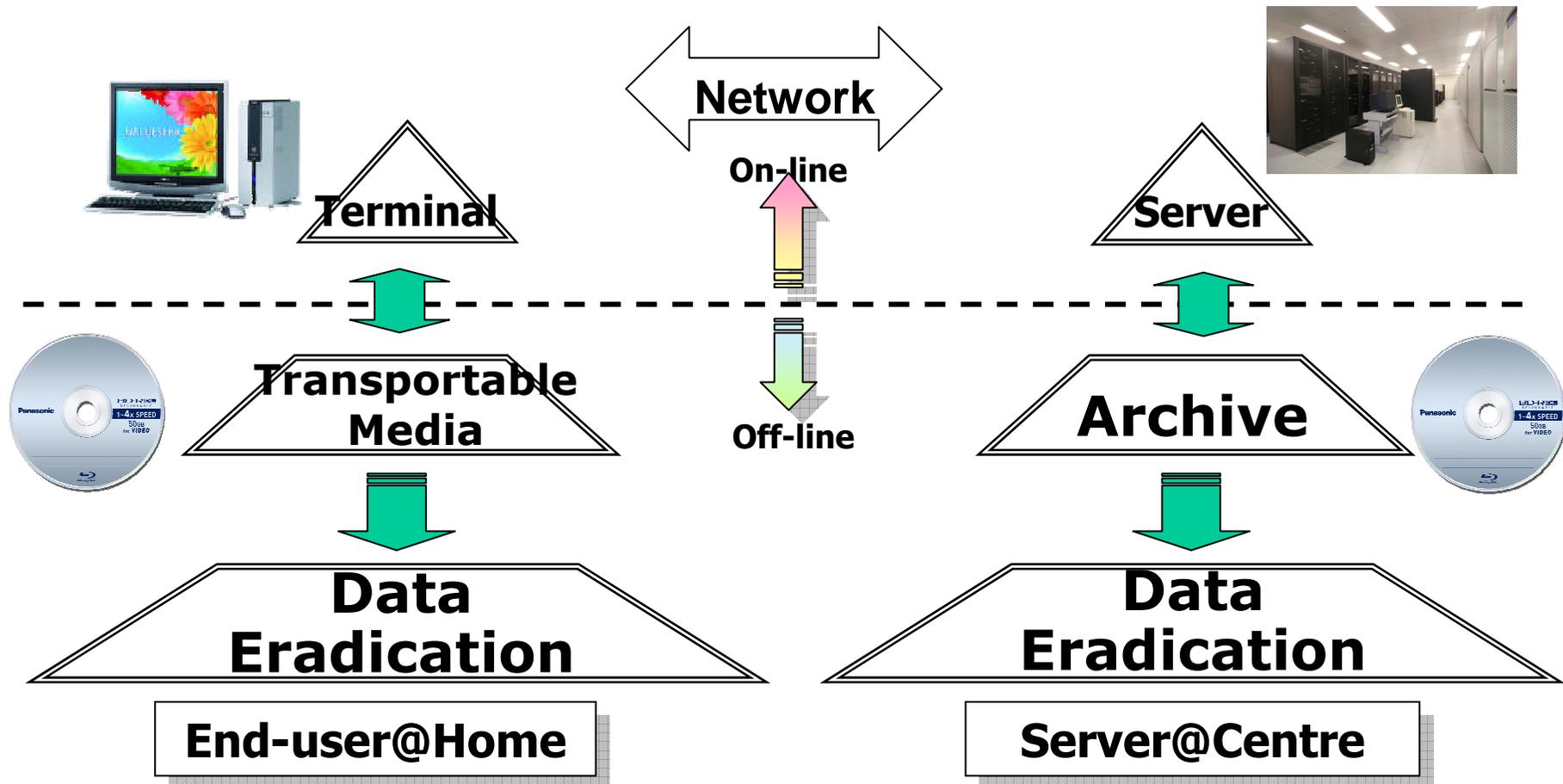


End-user@Home

Server@Centre

Eco Architecture

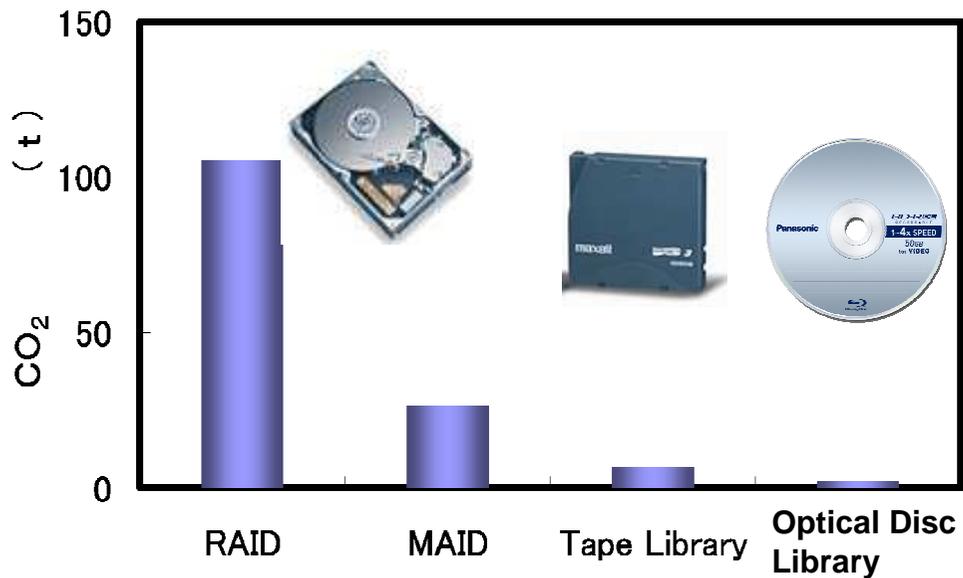
- Investigate to apply Information Memory system on current architecture
- Utilize storage method with low CO₂ emission, such as optical disk
- It also saves infrastructure investment
- Expect users' Eco Literacy



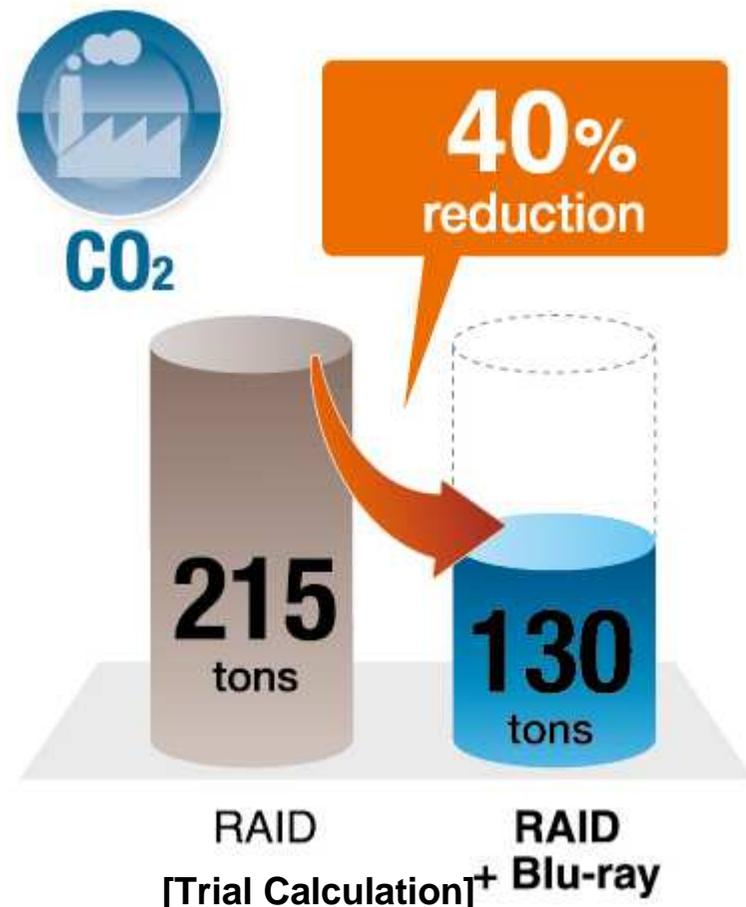
Example: Trial Calculation (1: Server)

- Assumption
 - 1) Total capacity for 1,000 TB of data storage for a year
40%(400TB) of data storage which moved into **BD archive**
 - 2) Rules of data eradication make more reduction of CO₂ emission

Carbon footprint for 1000 TB



[4] MIC report



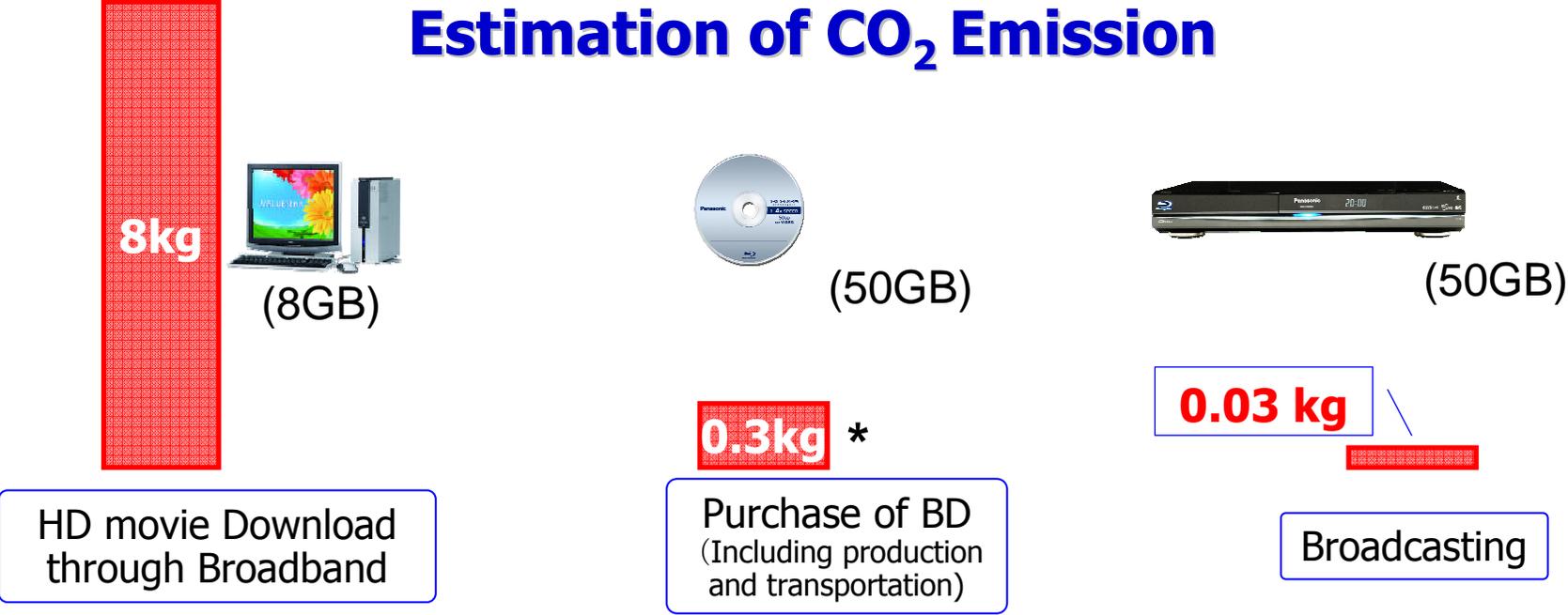
RAID [Trial Calculation]⁺ RAID Blu-ray

Example: Trial Calculation (2: Terminal)

For terminal:

- Utilizing storage device is efficient for reducing of CO₂ emission
- Hybrid utilization of network and storage device increases efficiency

Estimation of CO₂ Emission



(*Calculated by data of Digital Entertainment Group, etc)

Suitable usage for BB

- Rapid distribution and exchange for data
- Virtual meeting by IP

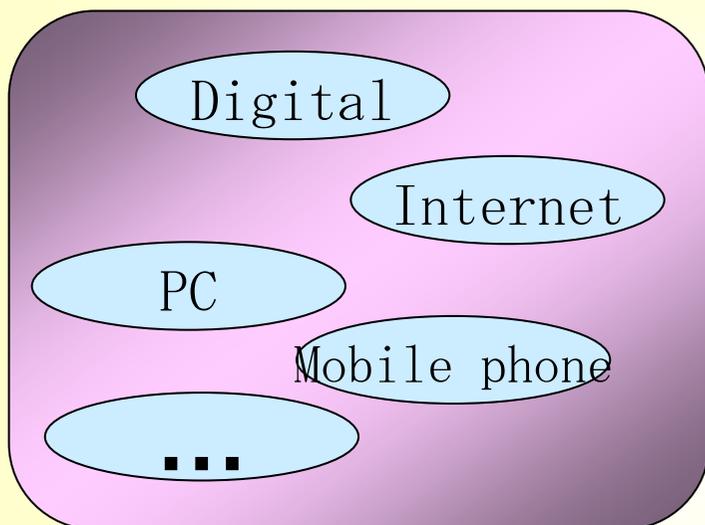
Suitable usage for media

- Exchanging BD among family
- Exchanging by PAN

Eco Literacy

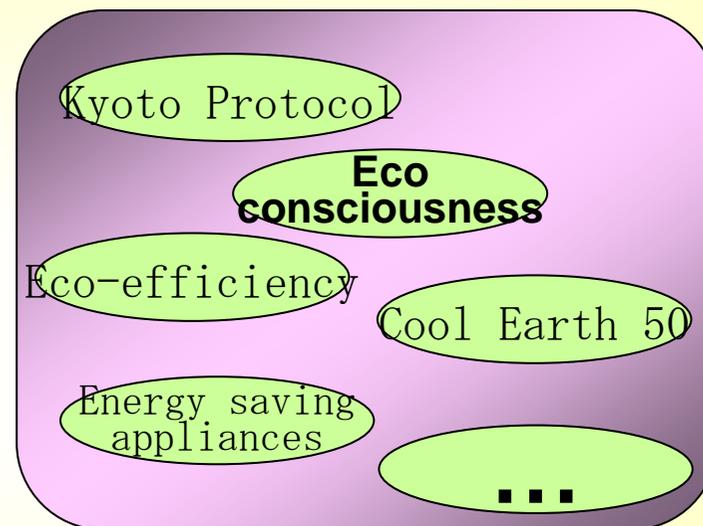
Let's think about Literacy to satisfy users

20th Century



IT Literacy

21st Century



Eco Literacy

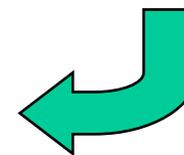
“Hybrid Usage” of Network and Memory



Gift of memories



In a hurry, TV conference



Panasonic ideas for life

Expectation to ITU-T : **Expand ITU-T Scope(1)**

ITU-T responsible for ICT standardization is expected to expand its activities to promote Eco-Architecture and Eco-Literacy fields to resolve Global Climate Change problems

1) Investigate at ITU :

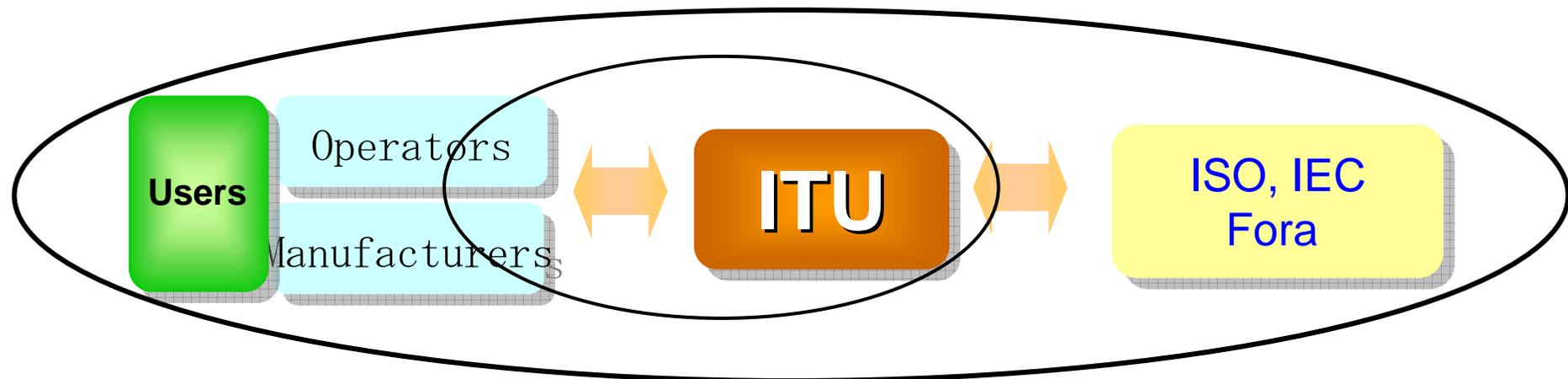
ex. the evaluation index such as carbon footprint of information traffic over network

2) Expect to provide the ways of the Eco-Literacy that users can be satisfied.

Expectation to ITU-T : **Expand ITU-T Scope(2)**

ICT experts should collaborate with those of other technologies fields to resolve Climate Change problems

- 1) Collaboration with other International SDOs such as ISO, IEC
ex. Energy saving of air-conditioning system in data centre**
- 2) Collaboration with corresponding Forums for each issue
ex. Digital Entertainment Group for its CO₂ emission data**



[References]

- [1] U.S. Environmental Protection Agency STAR Program
EPA/IDG: Reports Significant Energy Efficiency Opportunities for U.S. Servers
and Data Centers,
http://www.energystar.gov/index.cfm?c=prod_development.server_efficiency_study
- [2] The Expanding Digital Universe : Can we contain it?
- Dave Reinsel (IDC), INSIC Annual Symposium, July, 2007
- [3] The Diverse and Exploding Digital Universe EMC IDC
- John F. Gantz (IDC), IDC report sponsored by EMC, March, 2008
- [4] Study Group on ICT Policy for Addressing Global Warming report
- Ministry of Internal Affairs and Communications, Japan (April, 2008)