

Green Usage Monitoring Information Base

<http://www.ietf.org/id/draft-suganuma-greenmib-01.txt>

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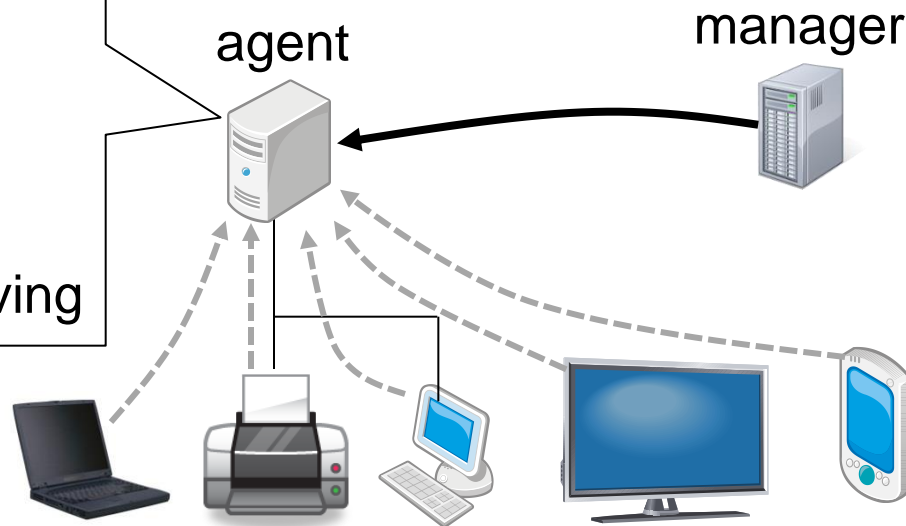
³ Cyber Solutions

Only 6 MOs

- Feature

- **Simple & easy** to use / Generic MIB

- Desktop : power on
- Printer : power off
- Laptop : sleep
- TV : power off
- Mobile : power saving



- Aim

- Experimental MIB

- Used widely for various experiments
 - Learn from usage

Green Usage Monitoring Information Base

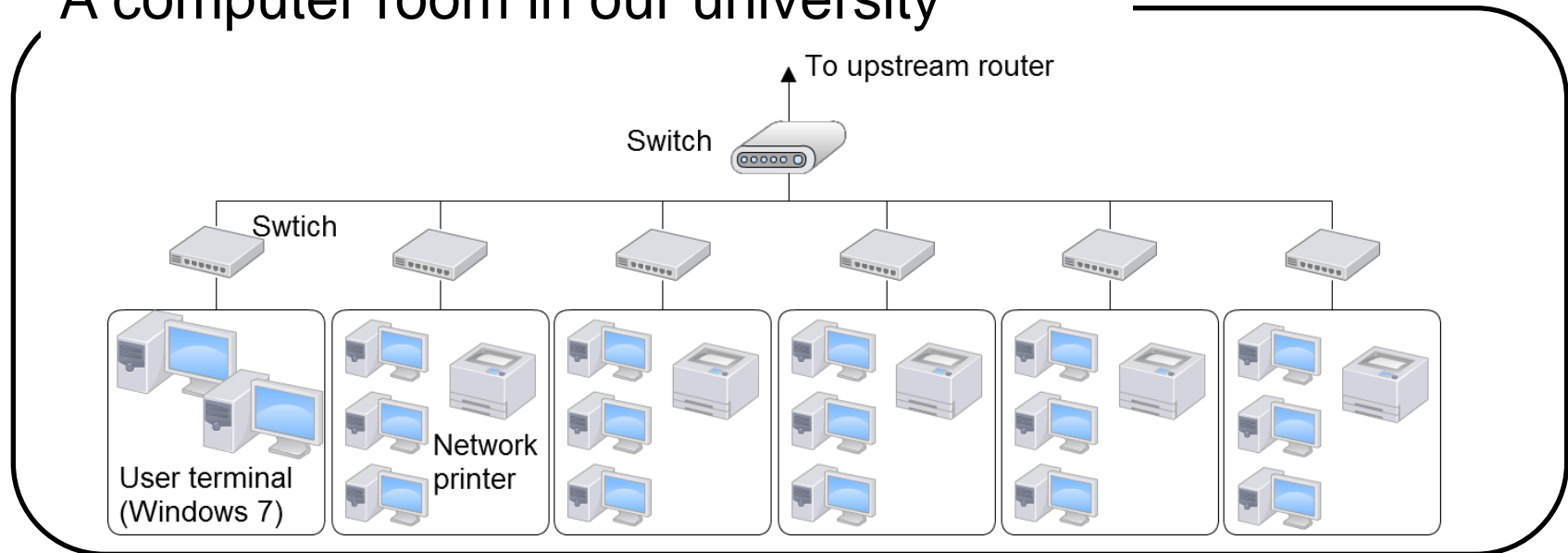
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Summary of major challenges

- Develop a prototype based on our MIB
- Experiment in a computer room in our university
- Estimate how much power is wasted

Experimental environment

A computer room in our university

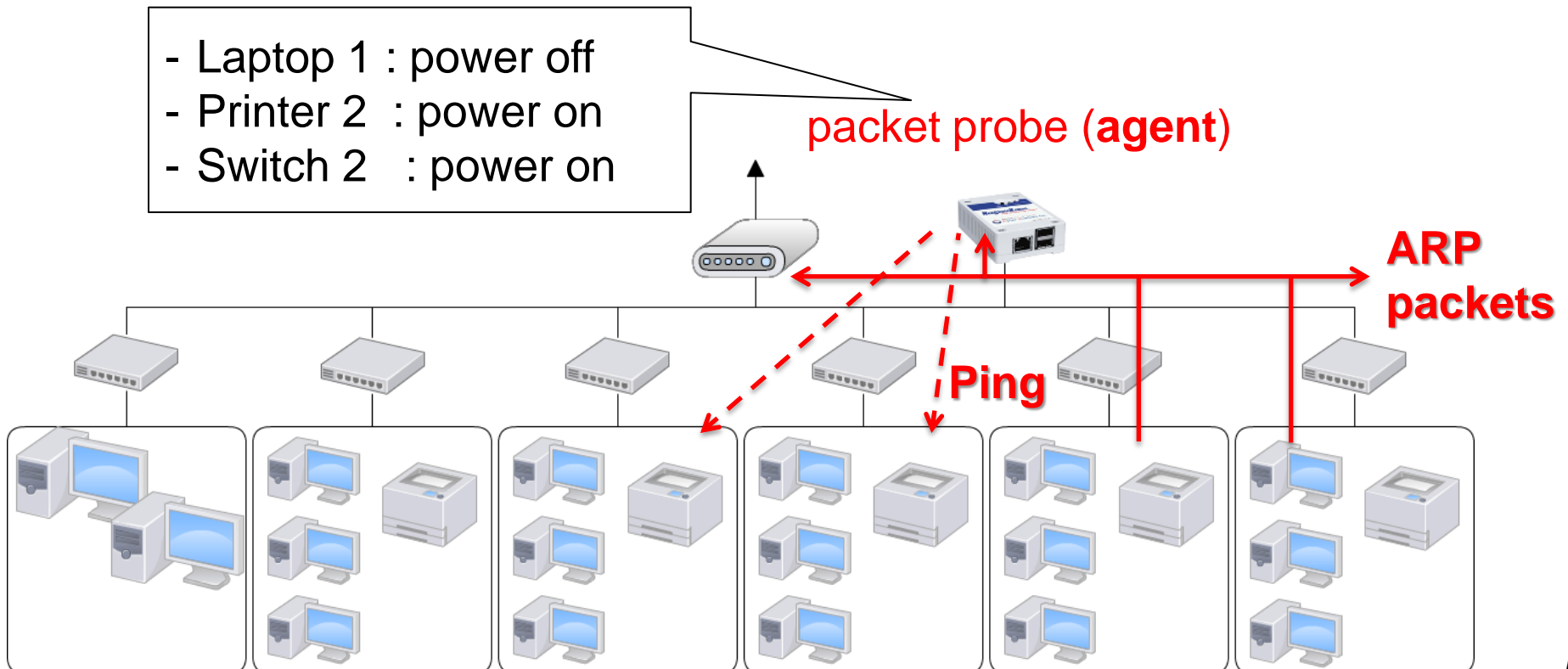


- 128 electrical devices in this room
 - 116 Windows7 user terminals
 - 5 network printers
 - 7 network switches
- Business hour is 8:30 – 20:00 (weekdays)

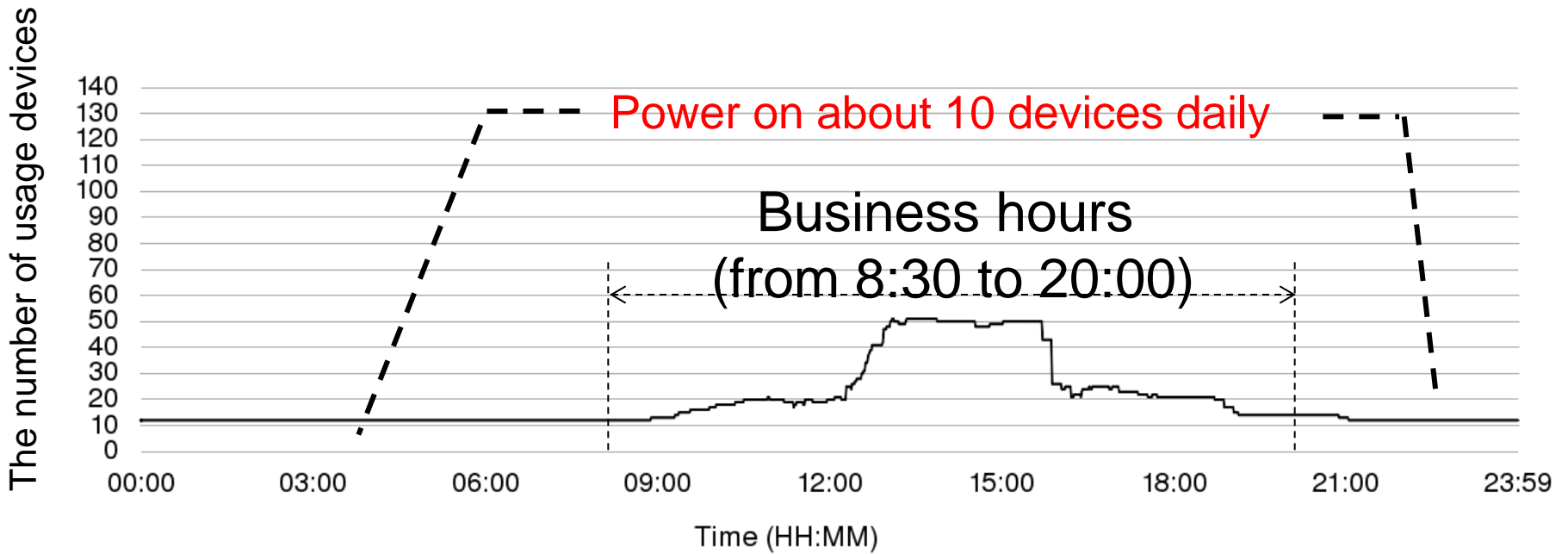
Data collection

- a packet probe as an agent
 - A part of parameters of MIB
 - GumDeviceStatus : powerOn, powerOff
 - GumStatusDetectionMethod : arpSensing, icmpEchoProbing

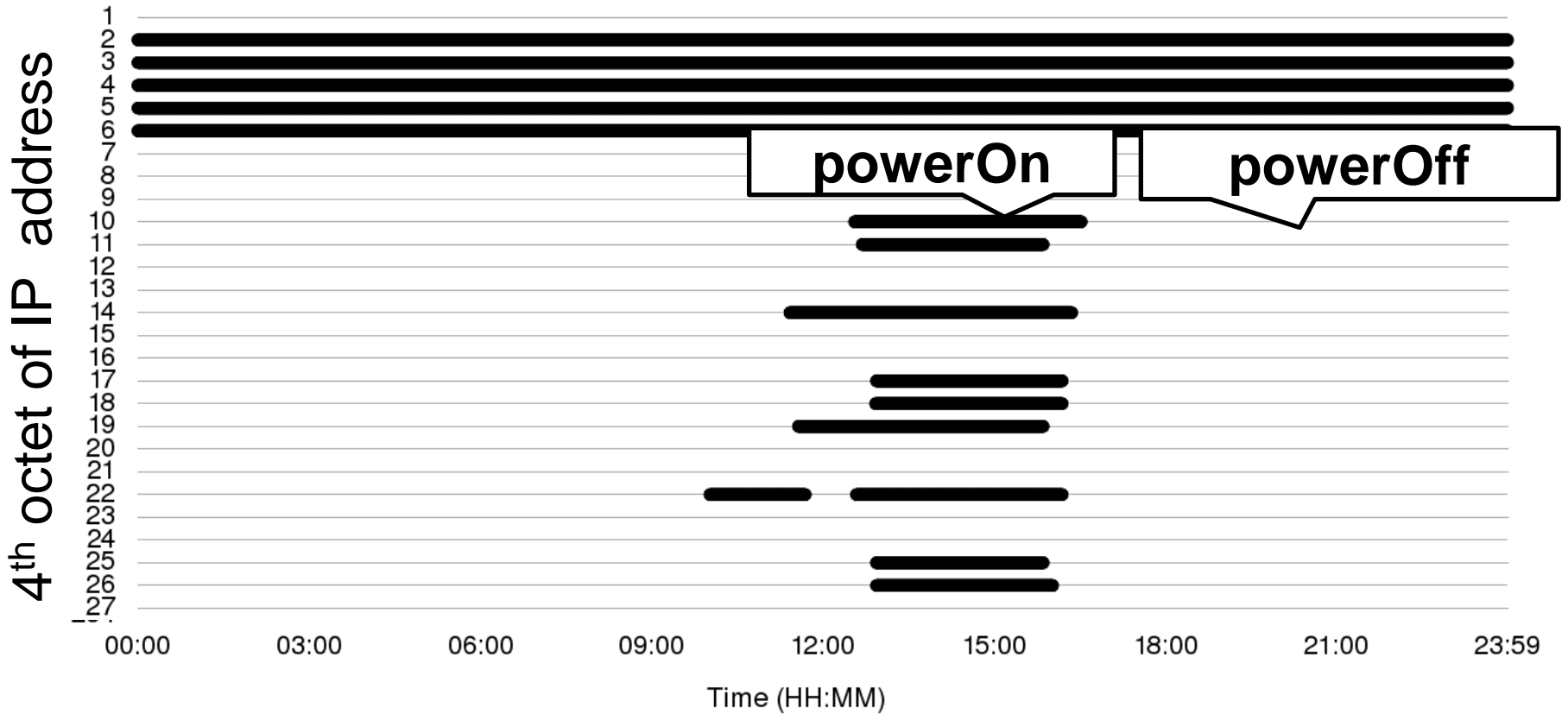
- Laptop 1 : power off
- Printer 2 : power on
- Switch 2 : power on



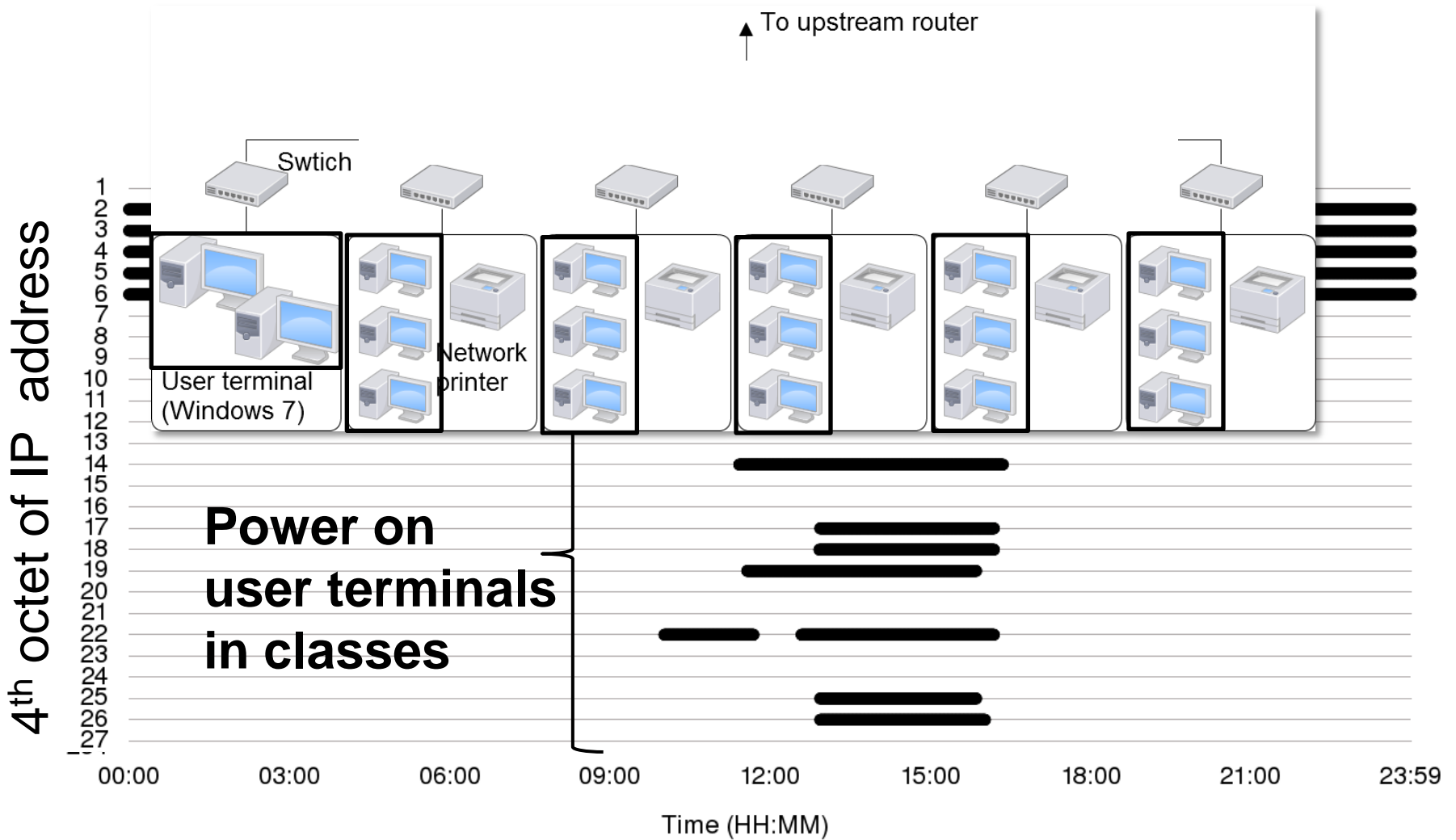
The number of usage devices



Example of device usages -1-

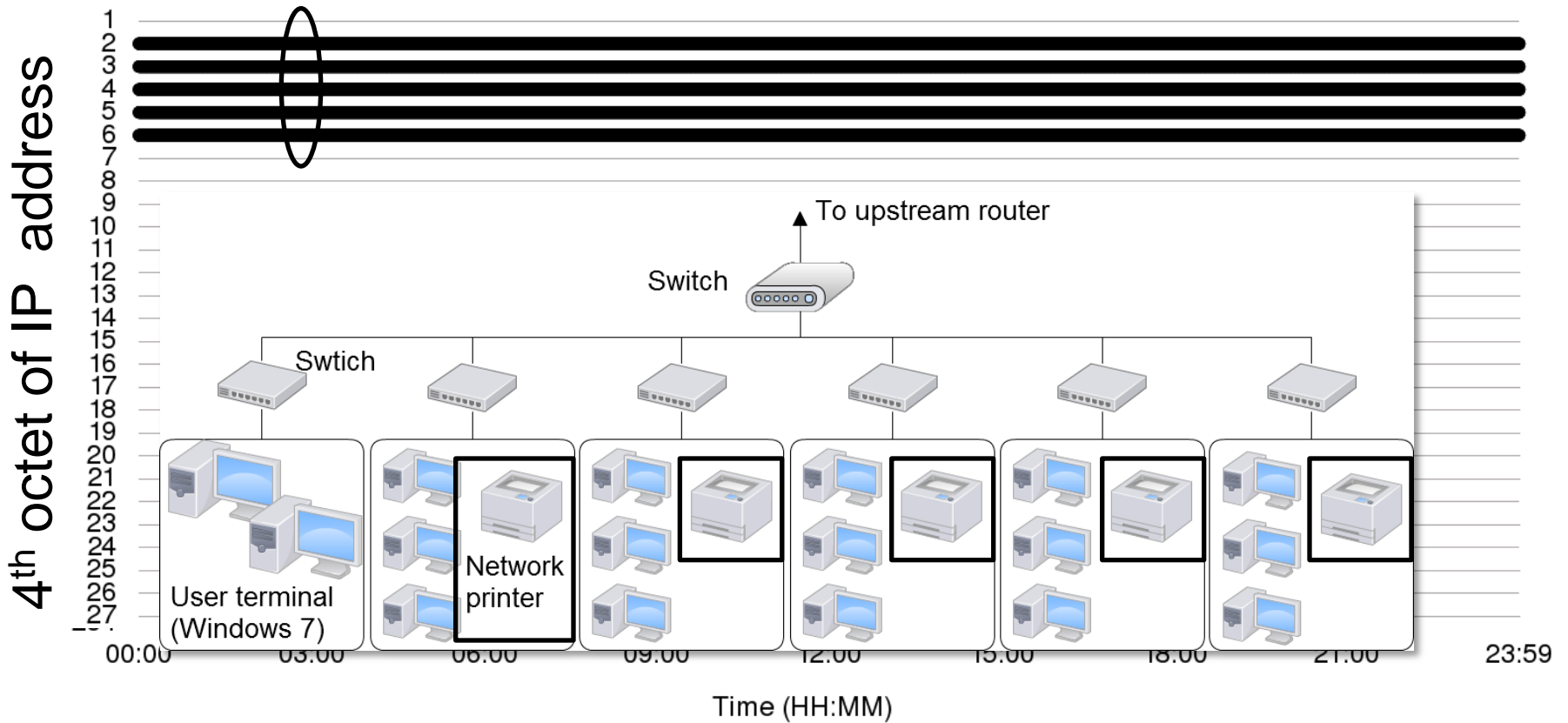


Example of device usages -1-

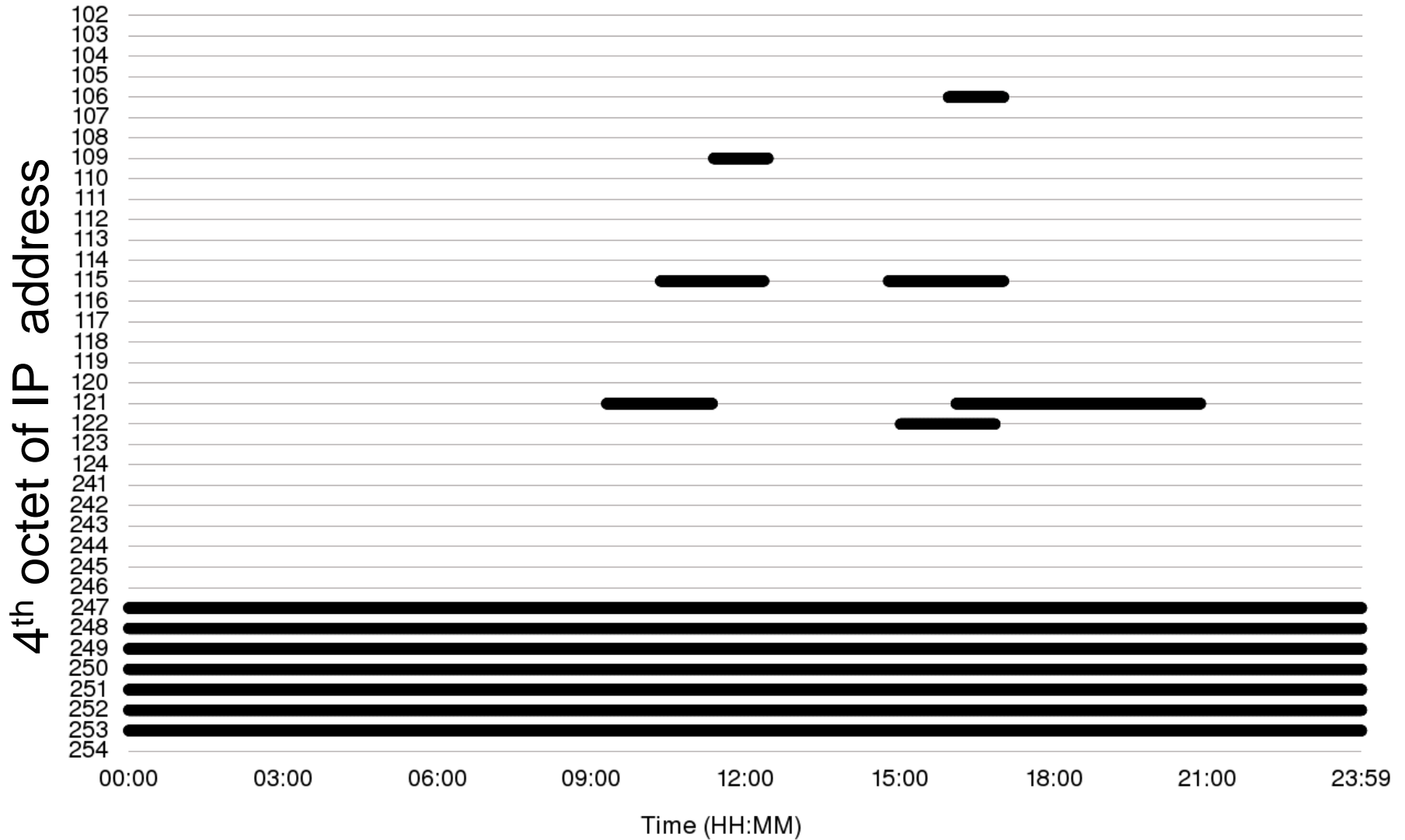


Example of device usages -1-

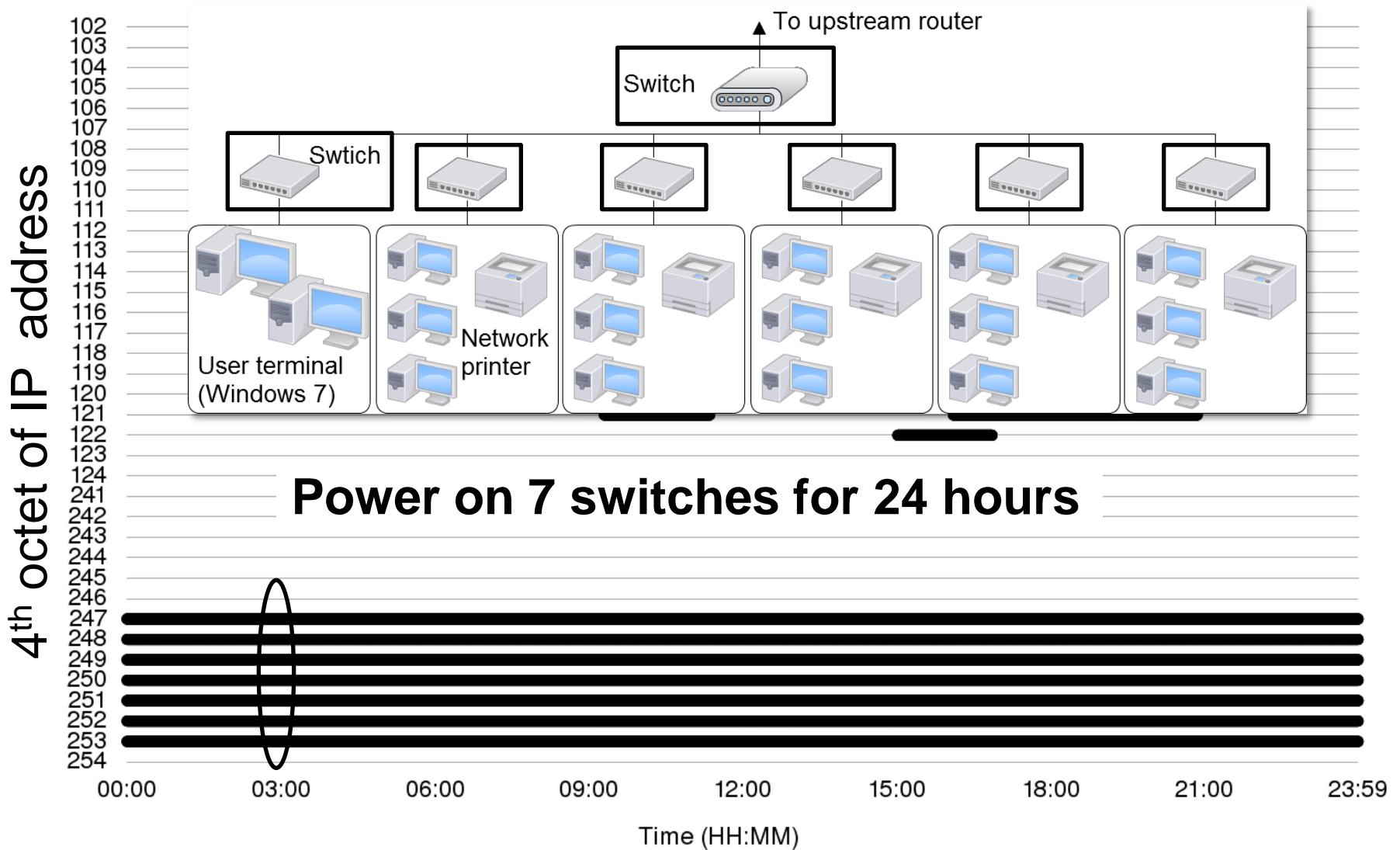
Power on 5 printers for 24 hours



Example of device usages -2-



Example of device usages -2-



What did we learn from usage

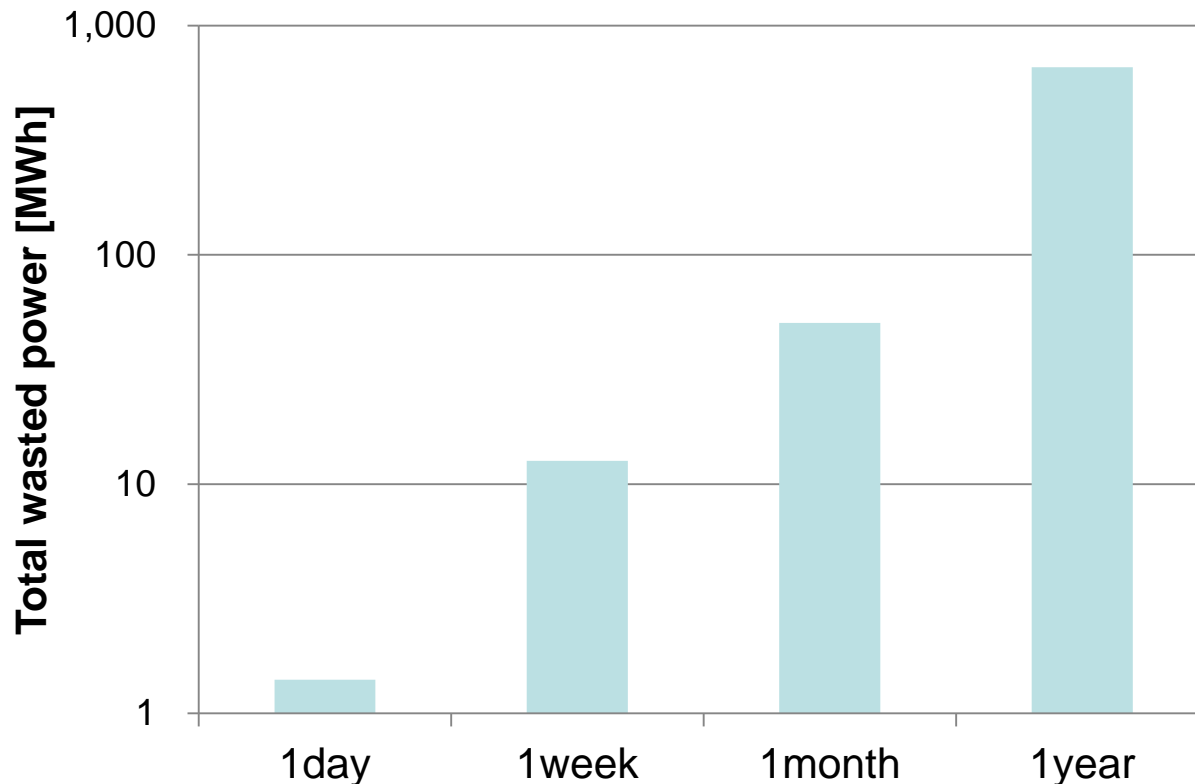
- Network printers and switches are sources of wasteful power consumption
 - Beyond the business hours
 - All user terminals are powered off
 - No one uses printers and network.
- They should be powered off beyond business hours
- Appropriate network configuration required

What did we learn from usage

How much power is wasted by printers?

If all universities in Japan consume power wastefully like us,

($5\text{W}/\text{printer} * 30 \text{ printers}/\text{university} * 780 \text{ universities in Japan}$)



657MWh will be wasted each year.

364t of CO₂.

What did we learn from usage

- We can learn these results from experiments when we **only** connected the Packet Probe to the target network
- > **Easy** to use

Next step

- Discussion in link into other MIBs (ENTITY-MIB and/or IF-MIB)
- Updated version in a few months from now
- Suggestions welcome