About R-CORD of NTT EAST

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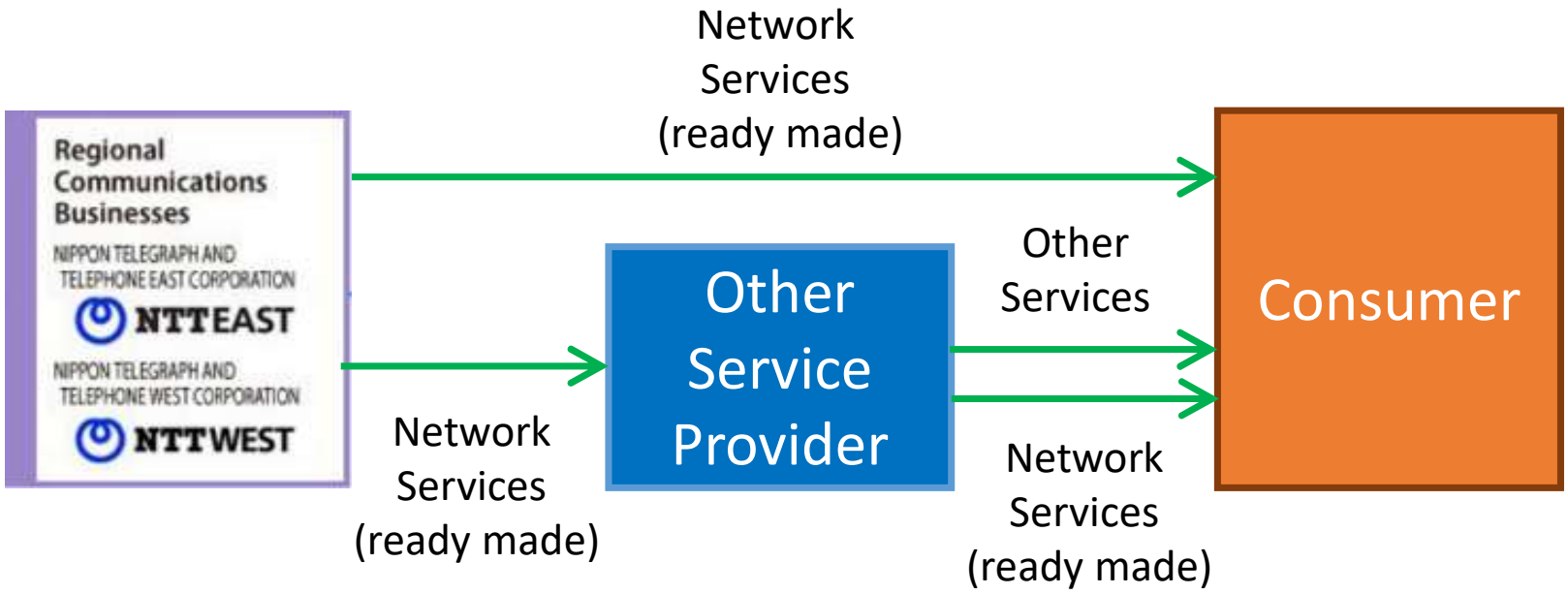
1. Profile of NTT EAST

- NTT group is composed by a holding company and several subsidiary companies.
- NTT EAST is one of the subsidiary companies and is in charge of the Regional Communication Businesses.

c.f. http://www.ntt.co.jp/gnavi_e/index.html

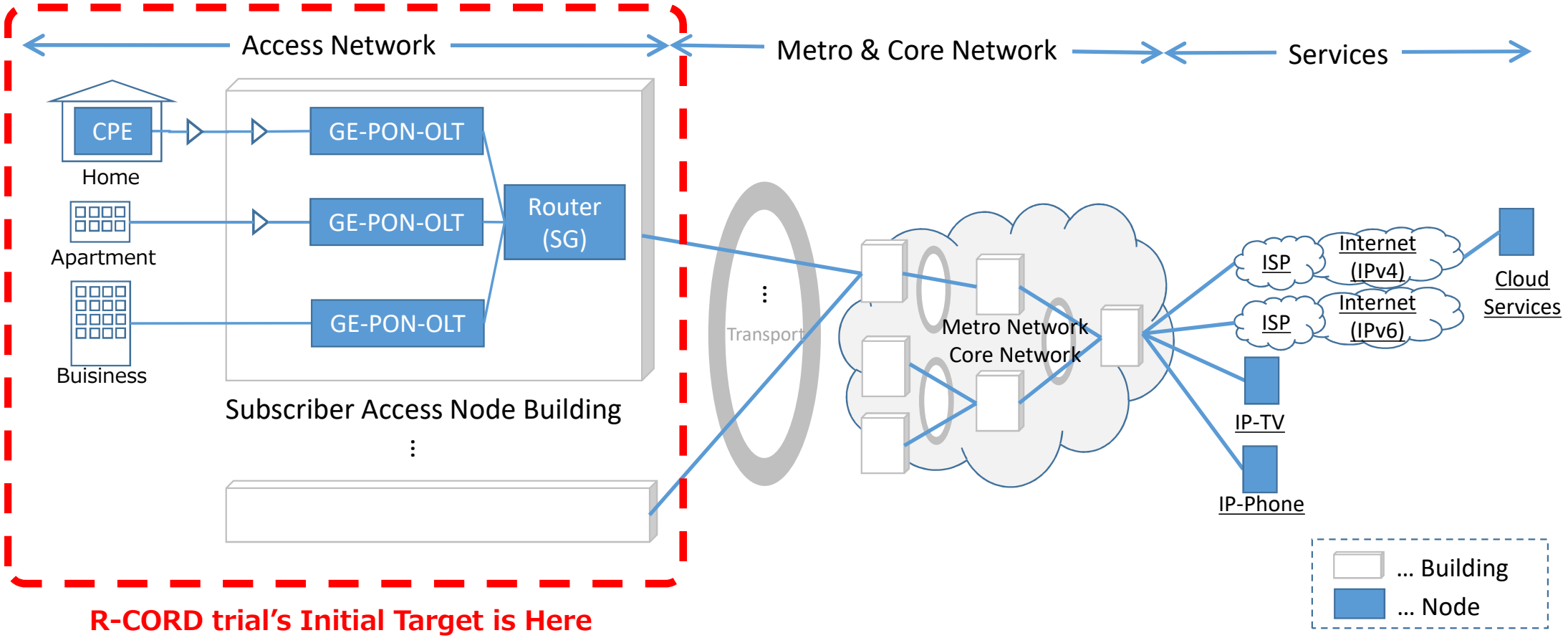
1. Profile of NTT EAST

- NTT EAST provide some network services (e.g. Internet access line) directly to consumer (we call this model as “B to C”).
- We also provide our network services to consumer through other service provider (We call this business model as “B to B to C”)



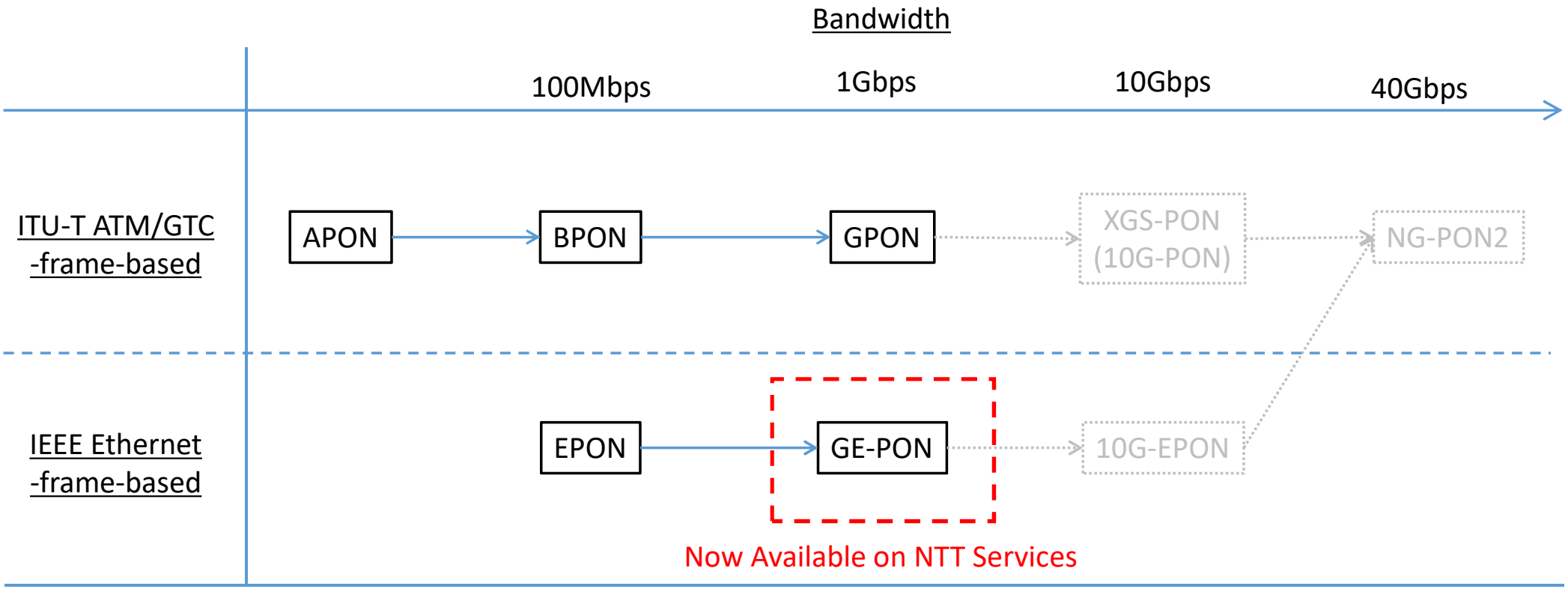
2-1. Overview of Our Network - Physical Network Topology -

- A network is mainly composed by Access Network and Metro & Core Network.
- A large part of network equipments is proprietary which are specified only for us.
- Initially, we are focusing on Access Network equipment and protocol in R-CORD project.



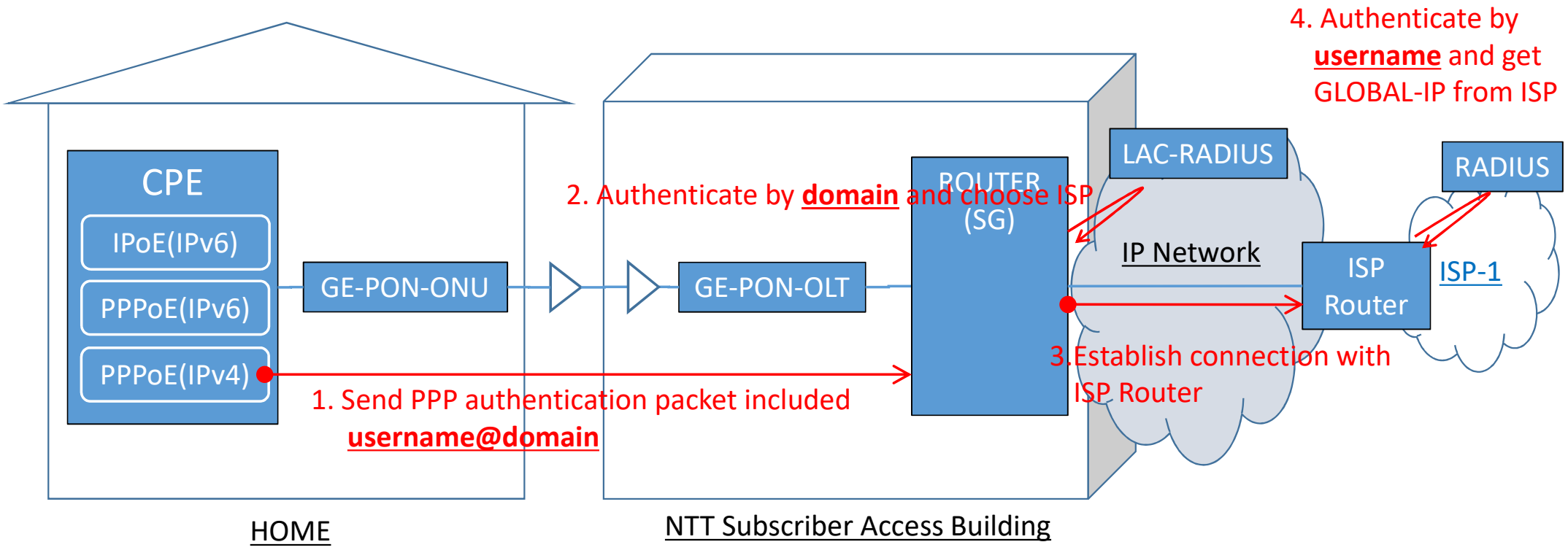
2-2. Overview of Our Network - GE-PON-OLT -

- NTT EAST provide the optical broadband access services to over 10 million subscribers.
- We use GE-PON-OLT for a large part of optical access services.



2-3. Overview of Our Network - PPPoE -

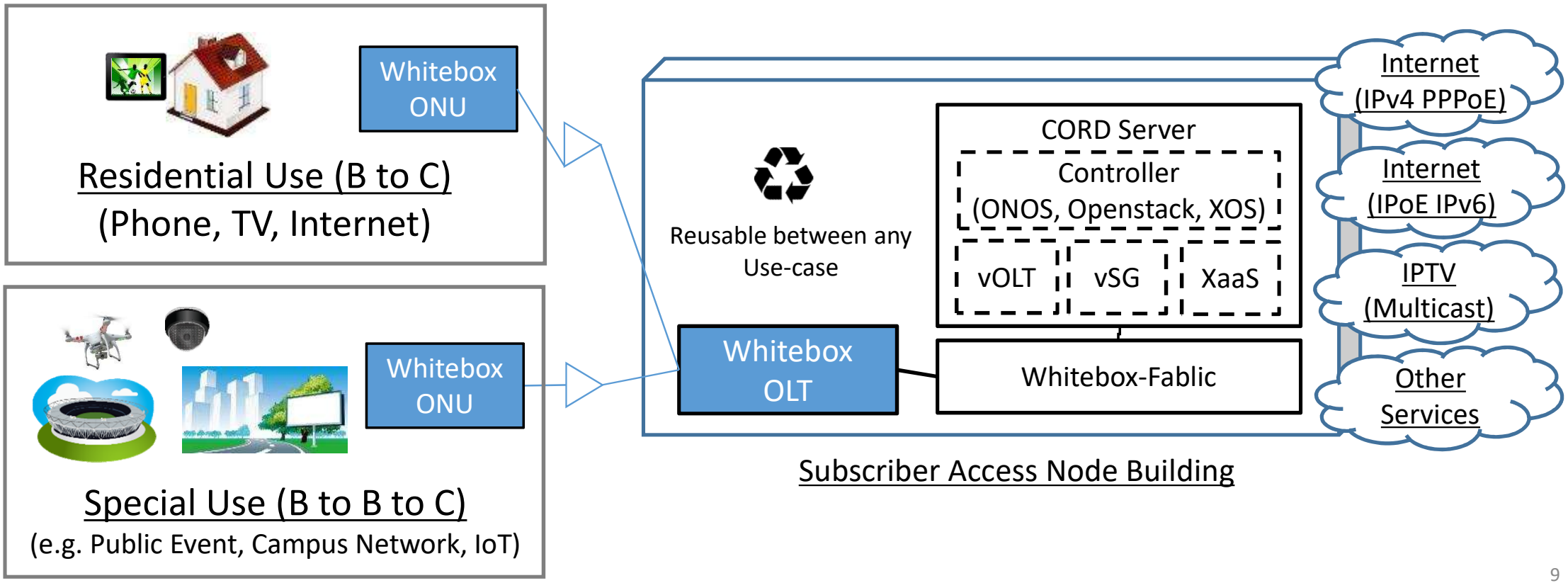
- Our network is composed by IPv4 and IPv6 as full dual stack network.
- CPE connect to services (like internet) with IPoE Native-mode and PPPoE Tunnel mode both.
- We are still using PPPoE(IPv4) for a large part of subscriber for connecting internet.



About Lab Trial

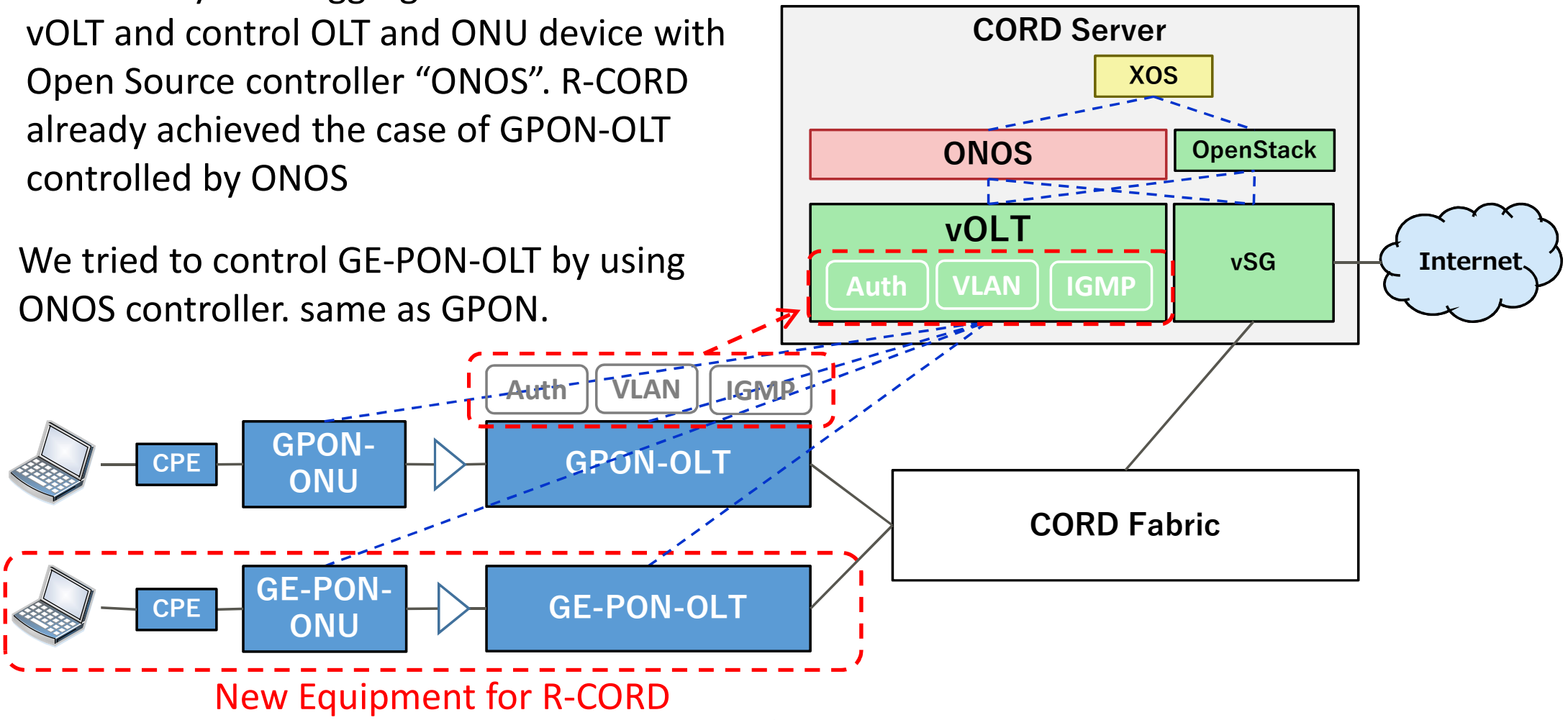
3-1. Purpose of Lab Trial

- It is our first challenge to reduce initial cost. We try to disaggregate some function by using commodity hardware and open software in this trial.
- Next challenge is to increase profit. We try to react with new customer Requirement more speedy and flexible. (e.g. Requirement of middle B of “B to B to C”)



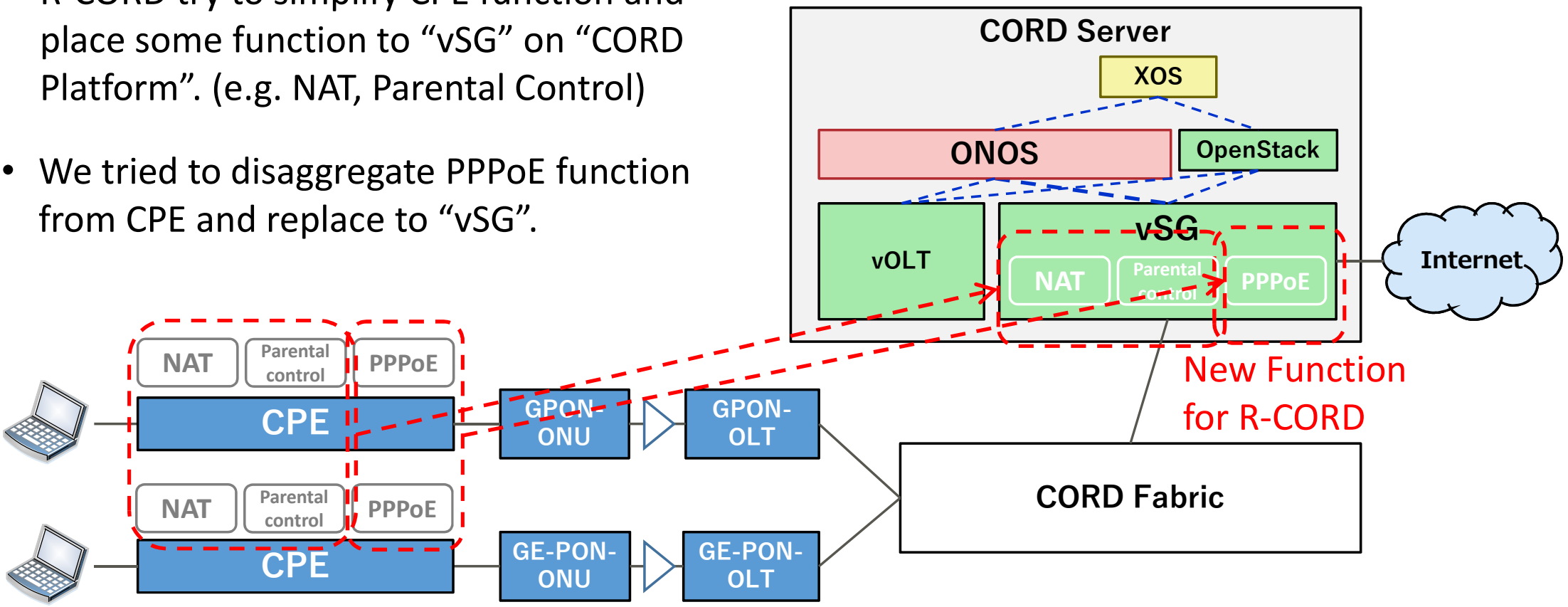
3-2. Lab Trial 1 - GE-PON-OLT -

- R-CORD try to disaggregate OLT function to vOLT and control OLT and ONU device with Open Source controller “ONOS”. R-CORD already achieved the case of GPON-OLT controlled by ONOS
- We tried to control GE-PON-OLT by using ONOS controller. same as GPON.



3-3. Lab Trial 2 - PPPoE -

- R-CORD try to simplify CPE function and place some function to “vSG” on “CORD Platform”. (e.g. NAT, Parental Control)
- We tried to disaggregate PPPoE function from CPE and replace to “vSG”.



5. Conclusion

- There is possibility to disaggregate some function from proprietary Equipment and re-make some open common function.
- We have a chance to reduce the cost by using commodity hardware which could be controlled by Open Controller like ONOS and CORD.

- With these flexibility of equipment and function, we will have much possibility to provide elastic network services not only to consumer directly, but also with service providers.