METHOD FOR EXTENDER PLACEMENT IN HOMES USING SMARTPHONE APP

INVENTOR:

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Description

- Use a Smartphone App as proxy at a possible location for an Extender before subscriber places Extender
  - Option A: Read SNR (or RSSI + Noise) from Android OS. On iOS, use AP to gather SNR from phone instead of the other way around (given iOS restriction on RSSI APIs) feeding back SNR to App
    - With SNR compute expected MCS
  - Option B: Find a proxy for SNR between smartphone and existing AP (e.g., throughput test + AP capabilities + client capabilities => MCS, taking into account client<->AP #SS capability
- Then use DS_service_tier*1.25 as minimum MCS rate, taking into account extender<->AP backhaul #SS capability
  - If DS_service_tier*1.25 > MCS rate, move closer to existing AP and restart with Option A or B above
  - If DS_service_tier*1.25 << MCS rate, move further from AP and closer to area needing coverage and restart with Option A or B above
  - If DS_service_tier*1.25 ~~ MCS rate, good place for Extender!
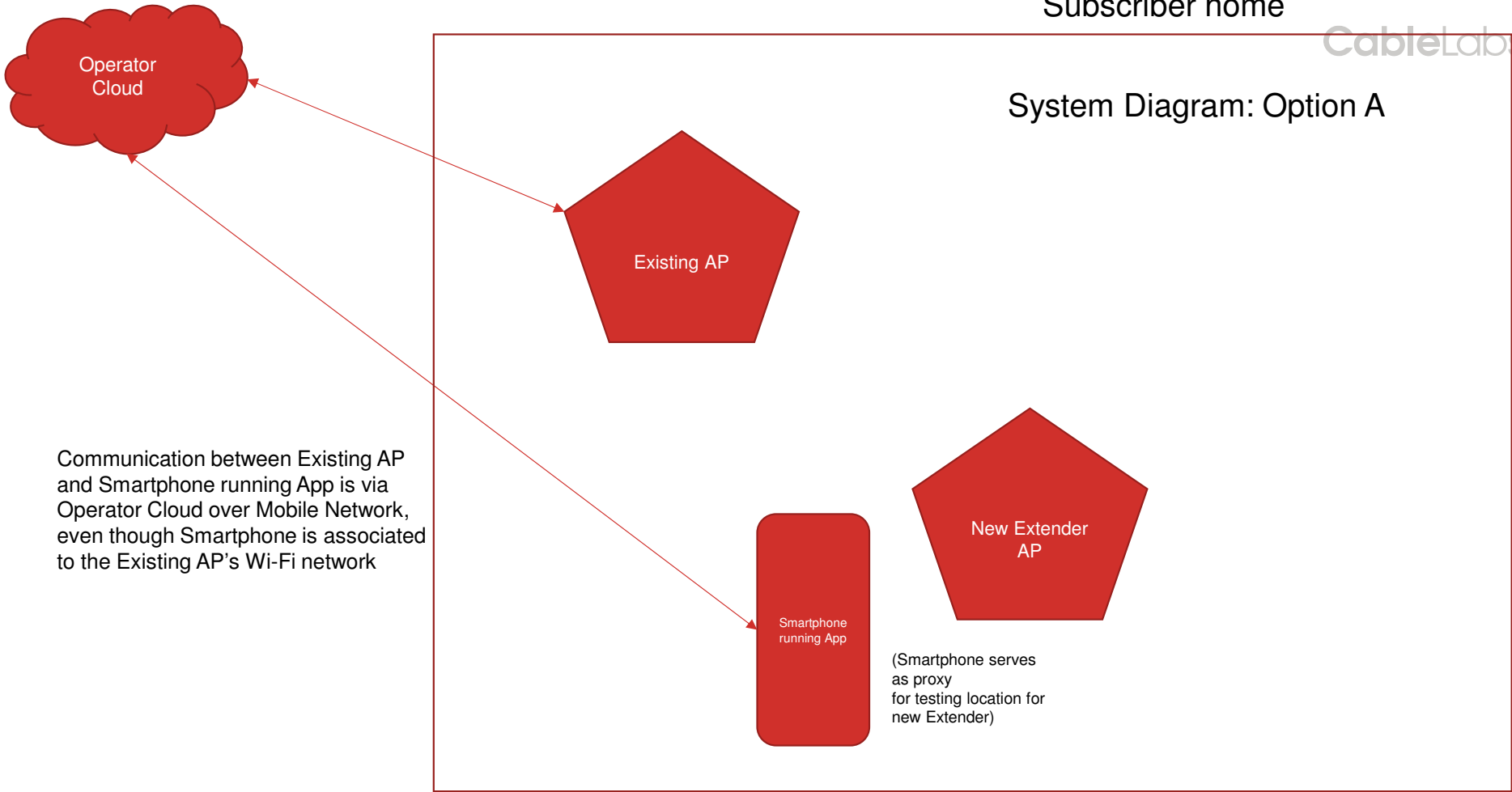
Background

Placing wireless backhauled extenders in the home is difficult, as finding a good location that provides coverage desired while not creating an additional wireless bottleneck is not straightforward nor intuitive.

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- System and Flow Diagrams

Subscriber home

System Diagram: Option A

Operator Cloud

Existing AP

New Extender AP

Smartphone running App

(Smartphone serves as proxy for testing location for new Extender)

Communication between Existing AP and Smartphone running App is via Operator Cloud over Mobile Network, even though Smartphone is associated to the Existing AP's Wi-Fi network
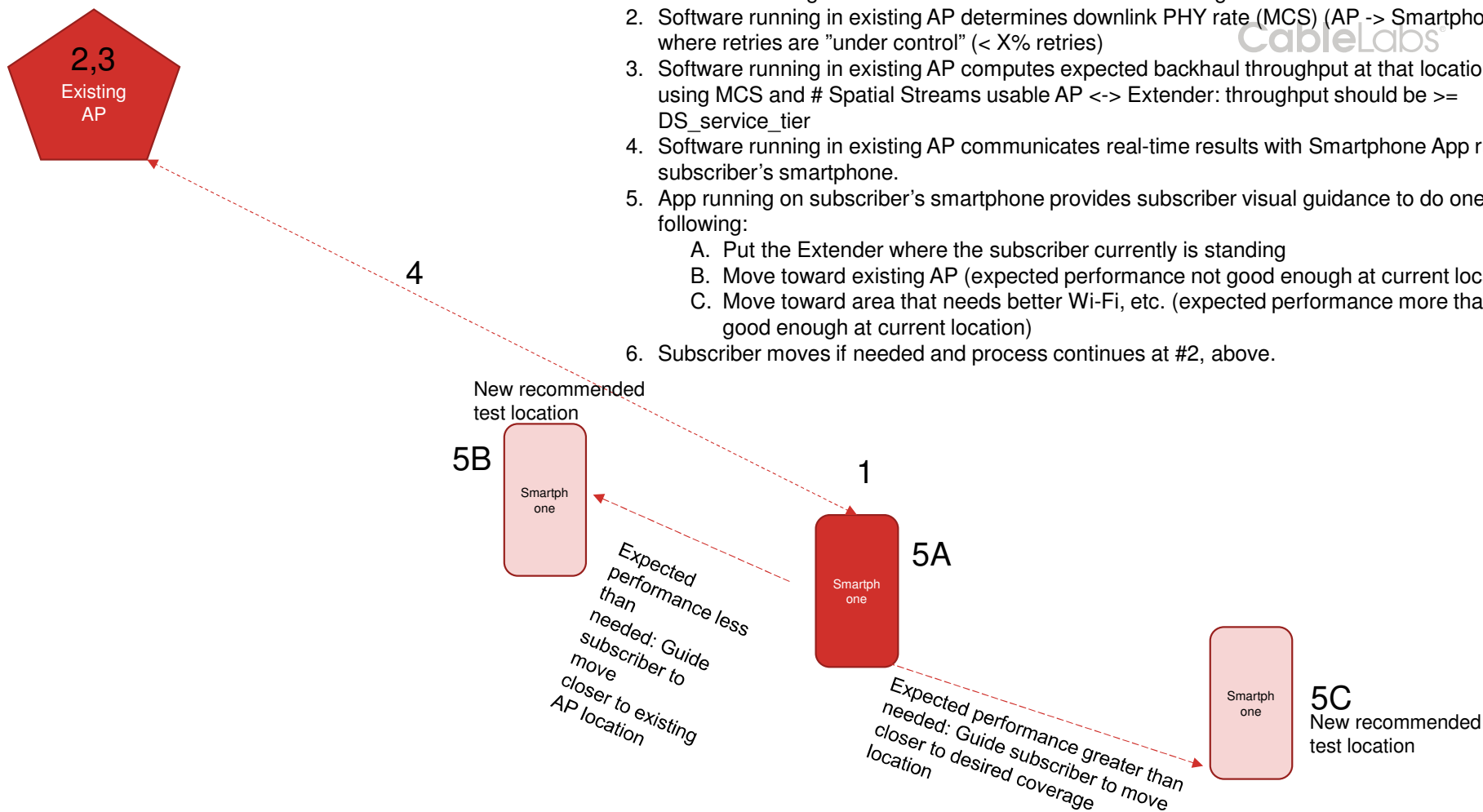
Subscriber home

ISP Cloud

Existing AP

New Extender
AP

Smartphone

(Smartphone serves
as proxy
for testing location for
new Extender)
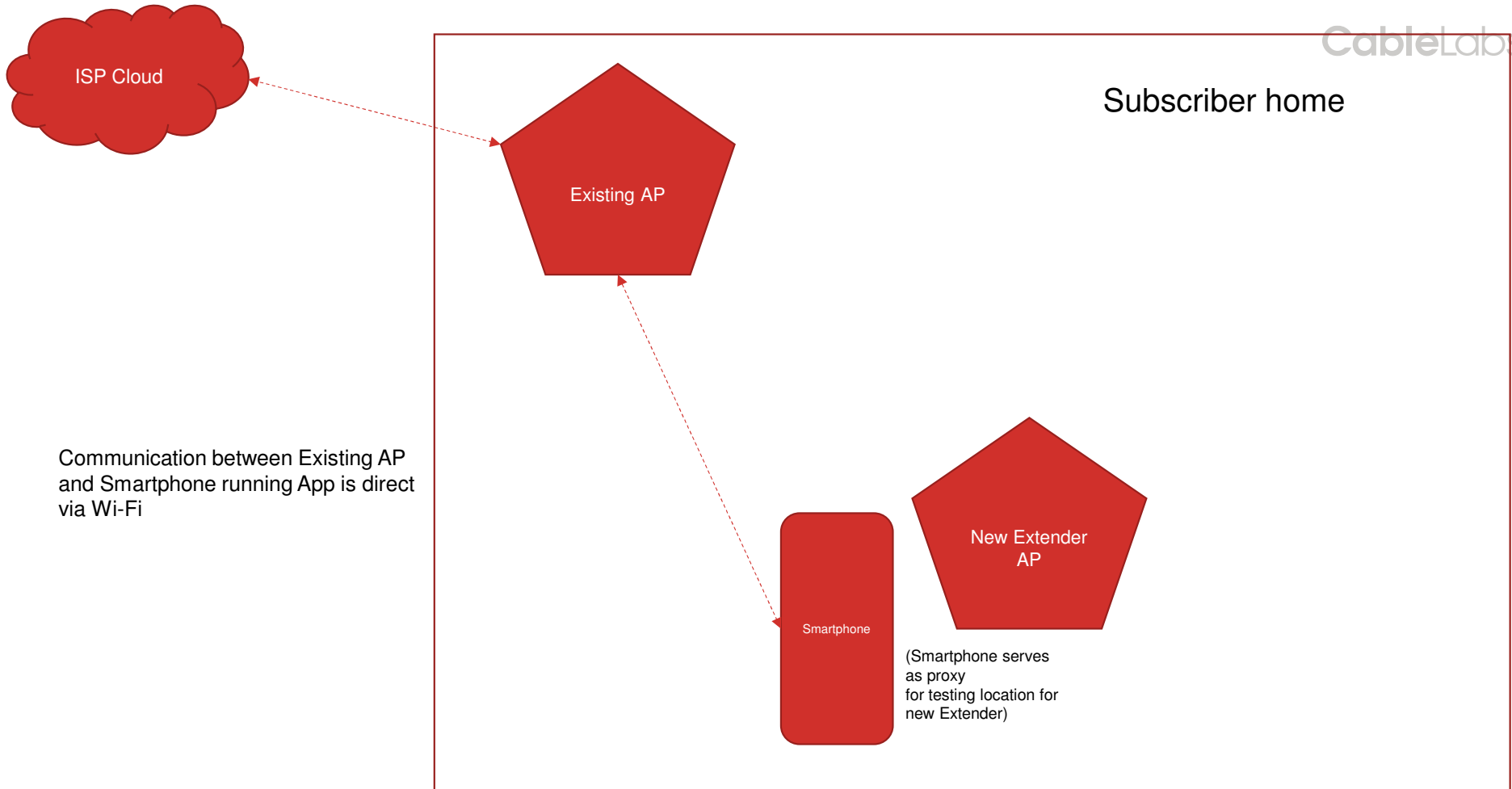
Communication between Existing AP
and Smartphone running App is direct
via Wi-Fi

System Flow

1. Smartphone is associated over Wi-Fi with Existing AP and user is positioned at some point between existing AP and area of new desired Wi-Fi coverage
2. Software running in existing AP determines downlink PHY rate (MCS) (AP -> Smartphone) where retries are "under control" (< X% retries)
3. Software running in existing AP computes expected backhaul throughput at that location using MCS and # Spatial Streams usable AP <-> Extender: throughput should be >= DS_service_tier
4. Software running in existing AP communicates real-time results with Smartphone App running subscriber's smartphone.
5. App running on subscriber's smartphone provides subscriber visual guidance to do one of the following:
   - A. Put the Extender where the subscriber currently is standing
   - B. Move toward existing AP (expected performance not good enough at current location)
   - C. Move toward area that needs better Wi-Fi, etc. (expected performance more than good enough at current location)
6. Subscriber moves if needed and process continues at #2, above.

2,3
Existing AP

4

New recommended test location

5B
Smartphone

1
Smartphone

5A

Expected performance less than needed: Guide subscriber to move closer to existing AP location

Expected performance greater than needed: Guide subscriber to move closer to desired coverage location

Smartphone

5C
New recommended test location

CableLabs

adding multiple extenders…

- First add one extender to enhance coverage in first area, using method described
- Next, add additional extenders to enhance coverage in each additional area in the same way