The ‘C’ between CN and CDN

Theophilus A. Benson, Marwan Fayed

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* CN == Community Network
** Ideas first presented at IRTF GAIA rg, IETF 111
Problem: Internet services are “inaccessible” to CNs

Communities can, do, and need to:

- design and deploy their own local infrastructure;
  - e.g. directional wi-fi, fibre, etc.
  - even if difficult, many-to-all aspects are within communities’ control or influence

- establish ‘backhaul’ to an exchange or Internet connection point;
  - e.g. cooperatively owned / operated, or via university, NREN, or publicly-funded network
  - even if difficult, many-to-all aspects are within communities’ control or influence

- purchase Internet services
  - i.e. routing and connectivity to the open Internet
  - most often purchased with backhaul, but this is not a requirement...
e.g. community connections to Internet service points

1. Co-location

2. Point-to-point

3. Community Cooperative

* Images credits due to Kari Linder.
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Community-driven Elements

Pricing is outside of control
(if service is available at all)
Observation:

CDNs are not Internet service providers…

…but they are well-connected* networks.

* relative to scale of service, whether regional, national, international.
What might CDNs and non-ISPs contribute to community networks?

...and reasons they should want to do so.
CDNs and non-ISPs have the facilities & features

- **Internally,**
  - have facilities to route data within the infrastructure;
  - probably run additional services related to content, security, or both.

- **Externally,**
  - have reliable, high-quality connectivity to the wider Internet;
  - announce reachable address ranges externally via BGP

- **Applies equally, irrespective of size**
  - differences are associated with scale, alone, e.g. locations, sizes of pipes, etc.
(Claim) Incentives align better with CDNs than with ISPs

- Additional bandwidth and service costs:
  - Large CDNs → unlikely to feel additional CN traffic, so it’s a social good
  - Small CDNs → could use additional CN traffic to negotiate better rates on larger connections.

- More connections → larger audience → happier customers!

- May also reduce customer costs
  - especially for those services that pre-date Internet
  - e.g. government services, who otherwise have to handle paper and phone calls.

- What about charging models? All reasons to charge no more than cost.
Challenges from experience

- Decoupling backhaul and transit-like services
  - Moving bits at L2 is different from routing at L3

- Still leaves backhaul as an open problem
  - Permission to mount antennas; availability of fibre; etc.

- IPv4 address space is non-trivial
  - IPv6 is likely, for now, an incomplete solution

- Incentivizing and accounting for people time and resources within the CDN
Questions about models of service delivery

Should the IETF or similar decide interfaces or best practices?
  ● Hard to know:
    ○ Ideally CDNs use open standards, but may not;
    ○ Sometimes unclear how to extend CDN-specific services in isolation, safe from the CDN itself.

What about commercial interests?
  ● Large CDNs -- remember, happier customers!

Could community cooperative models extend to this space? e.g. HUBS, guifi
  ● Open question, but existence of ‘open-source’ CDNs do raise possibilities.
Summary:

- CDNs are well connected
- Incentives have greater alignment
- No more than cost charging models
- Is there space for community or cooperative CDN, and does it make sense.