

The 'C' between CN and CDN

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* CN == Community Network

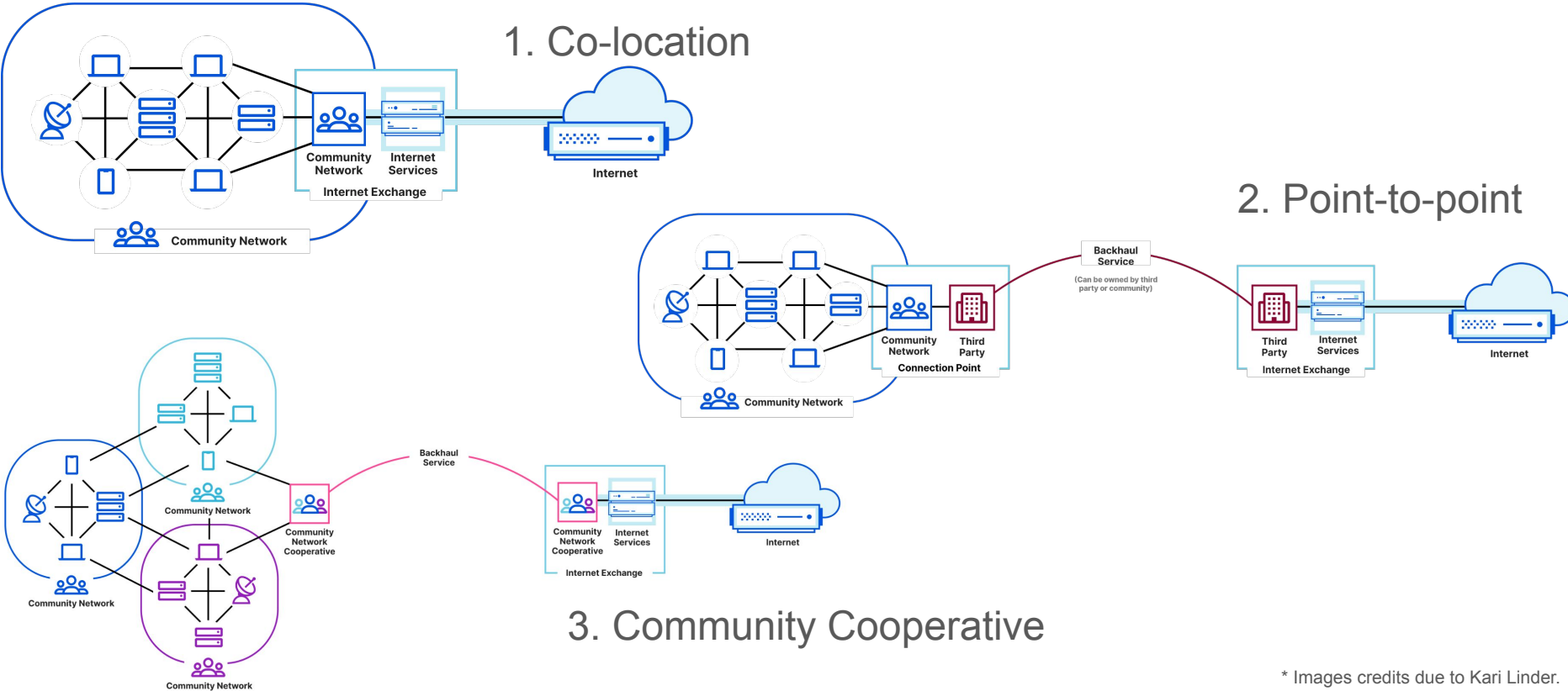
** Ideas first presented at IRTF GAIA rg, IETF 111

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



* Images credits due to Kari Linder.

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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 viable
- establish ‘backhaul’ to an exchange
 - e.g. cooperatively owned / operated, or via a third party
 - even if difficult, many-to-all aspects are viable
- purchase Internet services
 - i.e. routing and connectivity to the open Internet
 - **most often purchased with backhaul,**



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.**