Adapting to remote DNS for content delivery
`namehelp`

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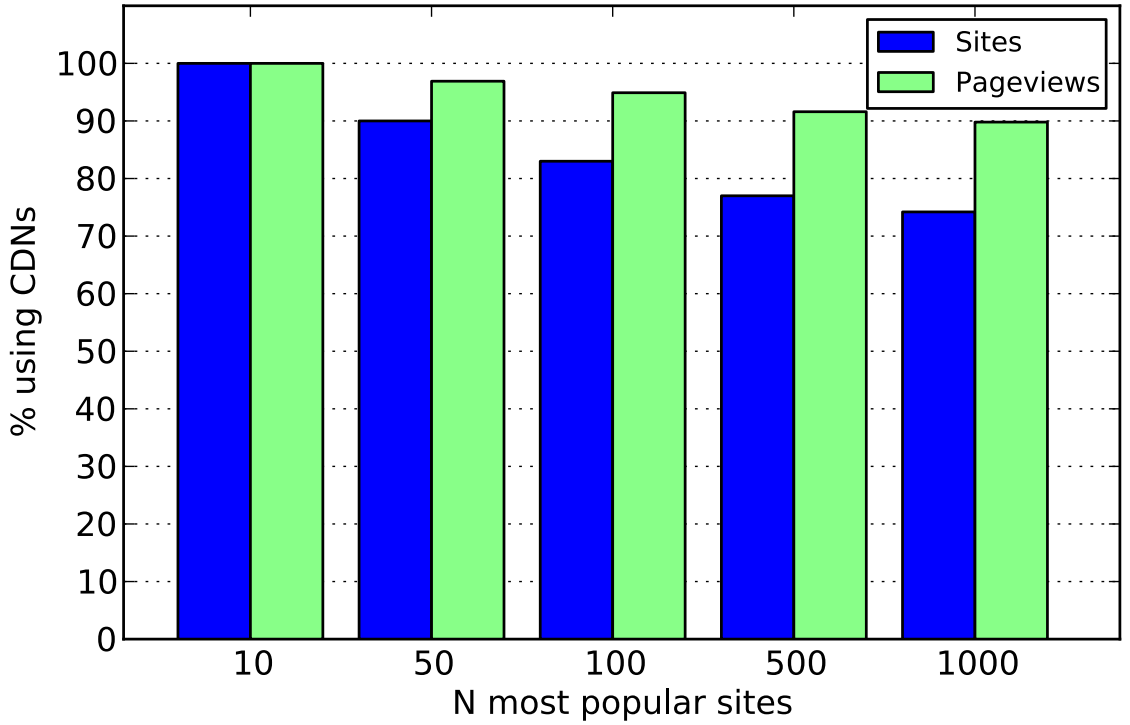
Feb 10, 2012

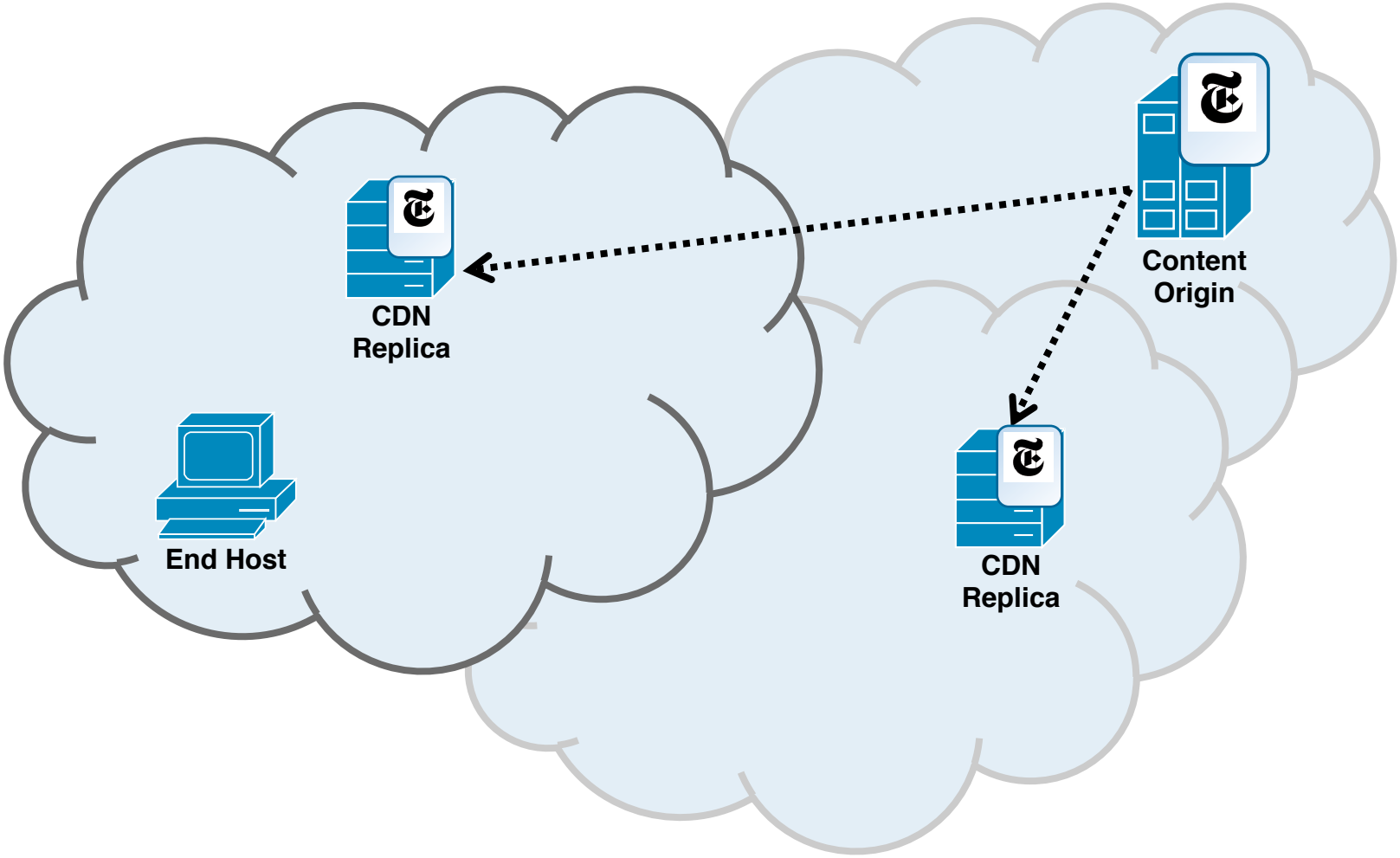
Ubiquity of Content Delivery Networks

- CDNs direct web clients to nearby content replicas
- Several motivations for using CDNs
  - Performance, scalability, reliability
- Most popular sites use them
  - 75% of top 1000 sites
  - 90% of pageviews to top 1000 sites



CDNs depend on DNS

- CDNs use DNS to map clients to servers
  - Assume proximity of client to DNS resolver



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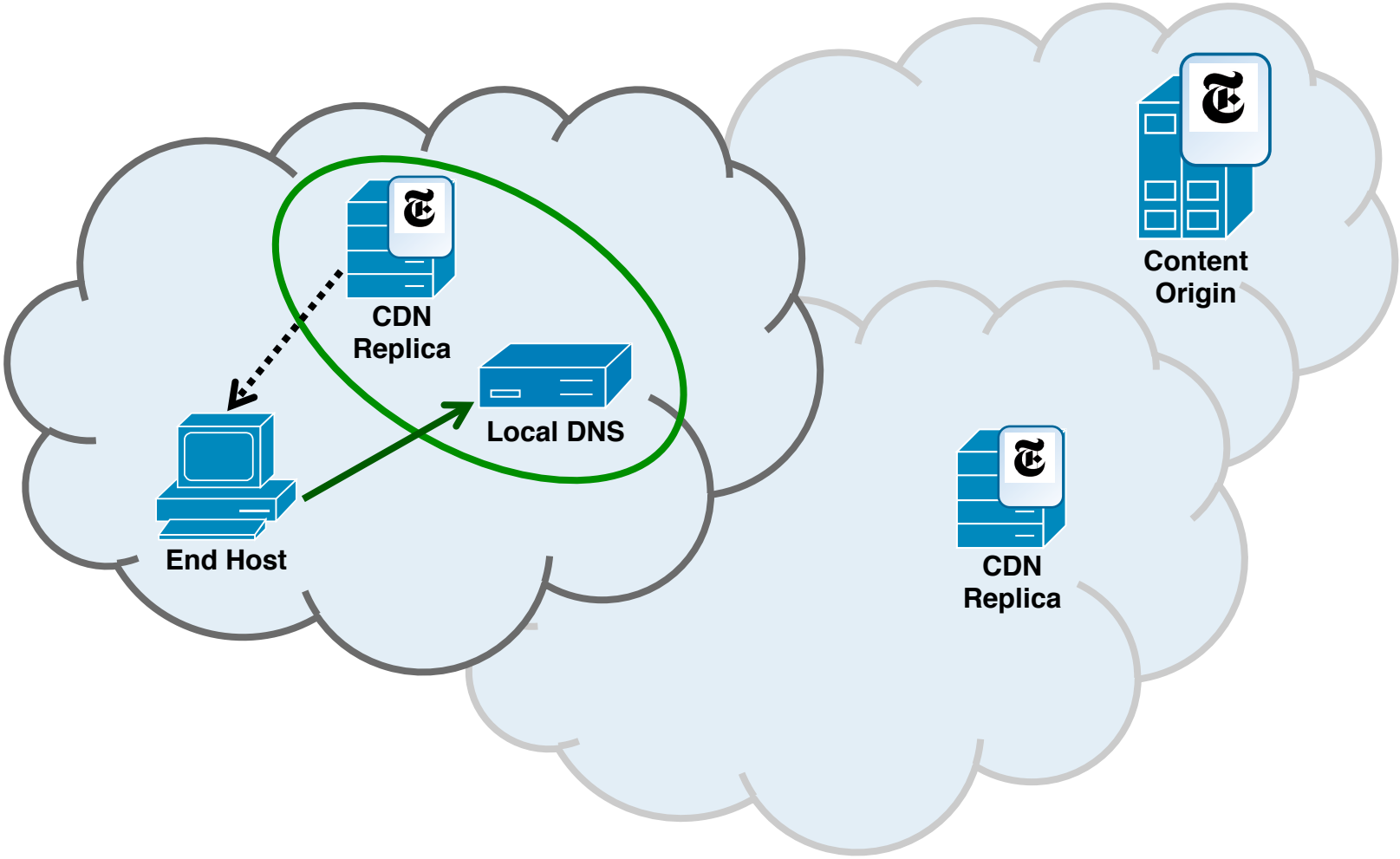

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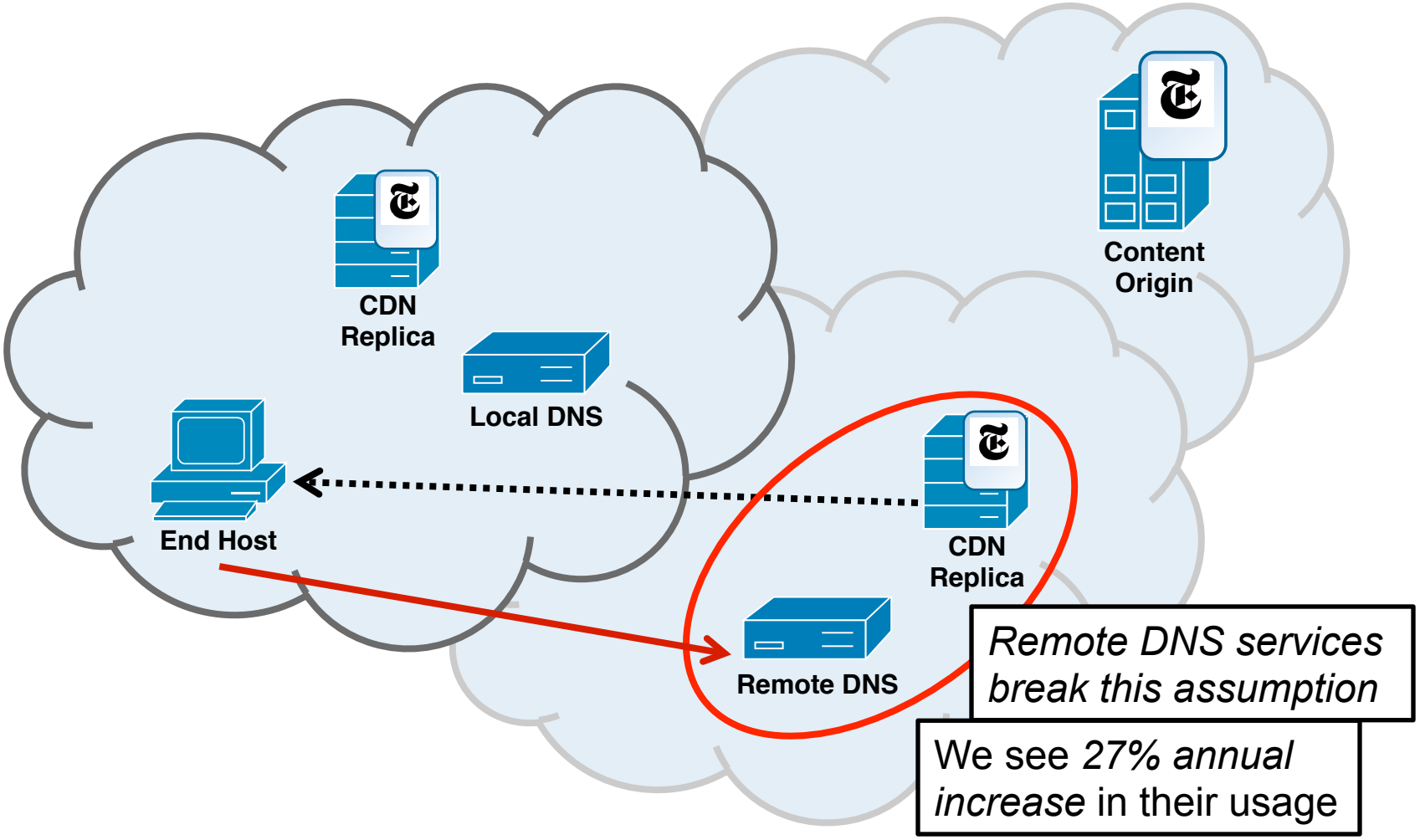


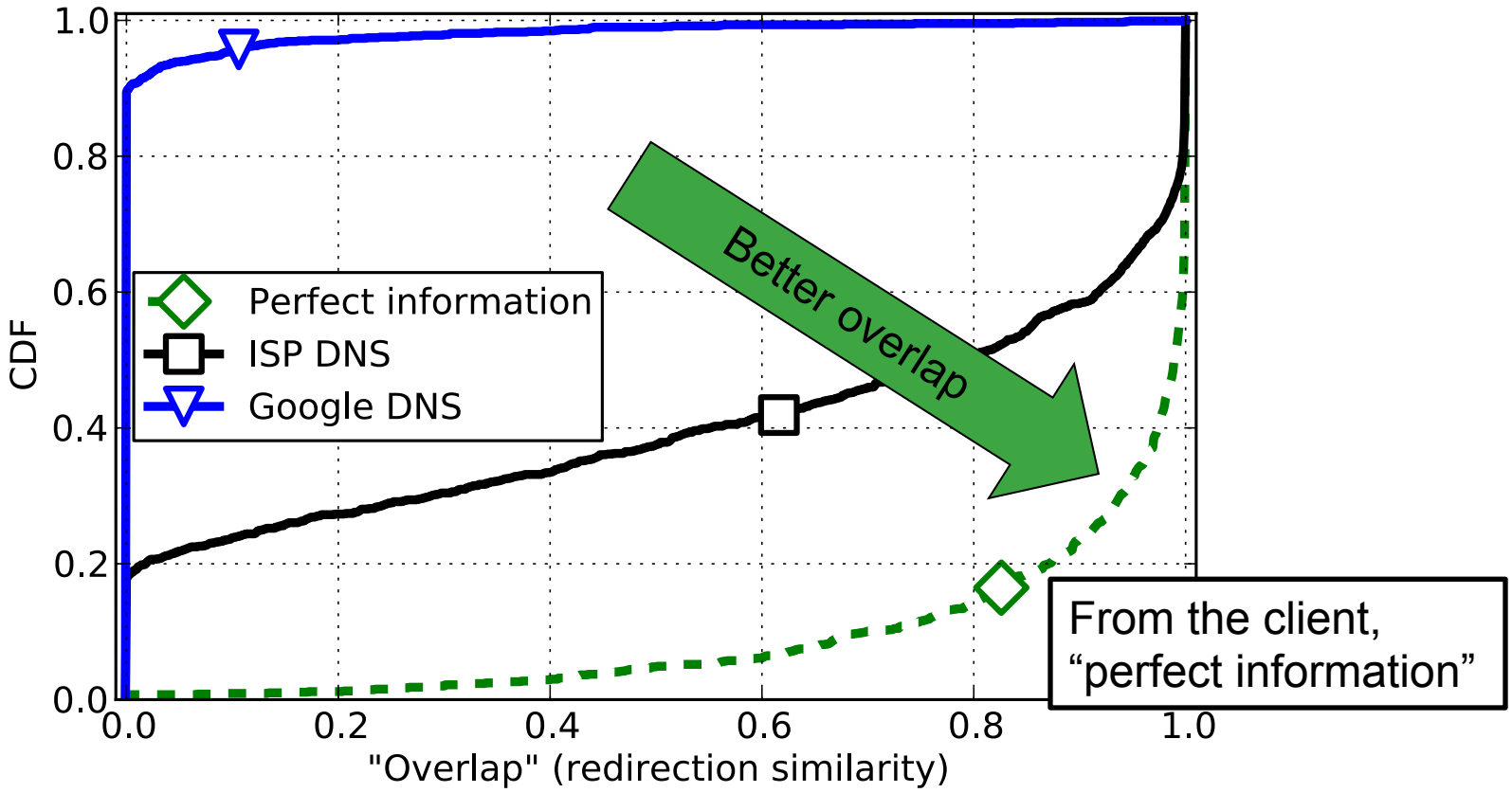
Question and research agenda

Can we maximize user benefits from both remote DNS and CDNs?

- Today…
- Compare CDN redirections and end-to-end performance
- Evaluate adoption of industry's response
- Present an end host solution

Impact of remote DNS on CDN redirections

- Remote DNS services yield radically different redirections
  - Minimal overlap with those seen from the client



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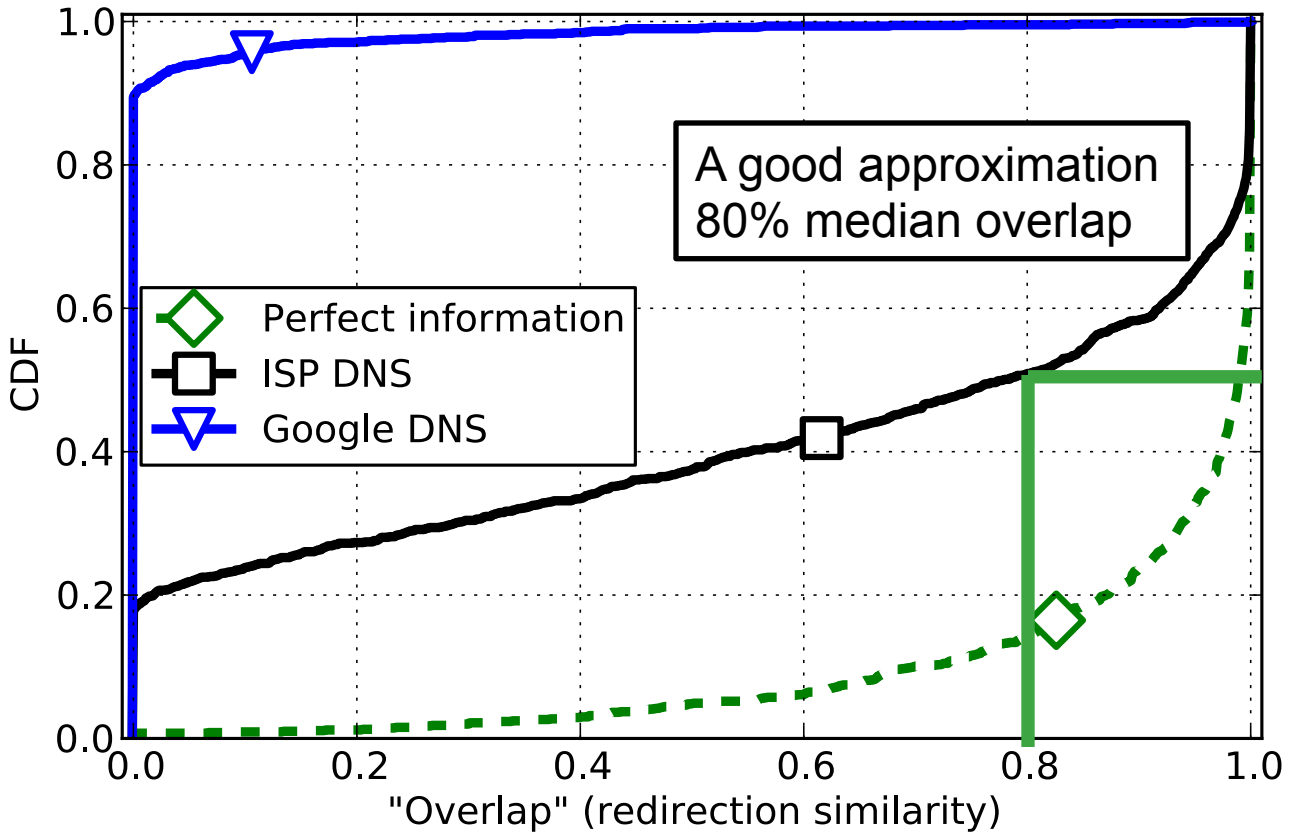

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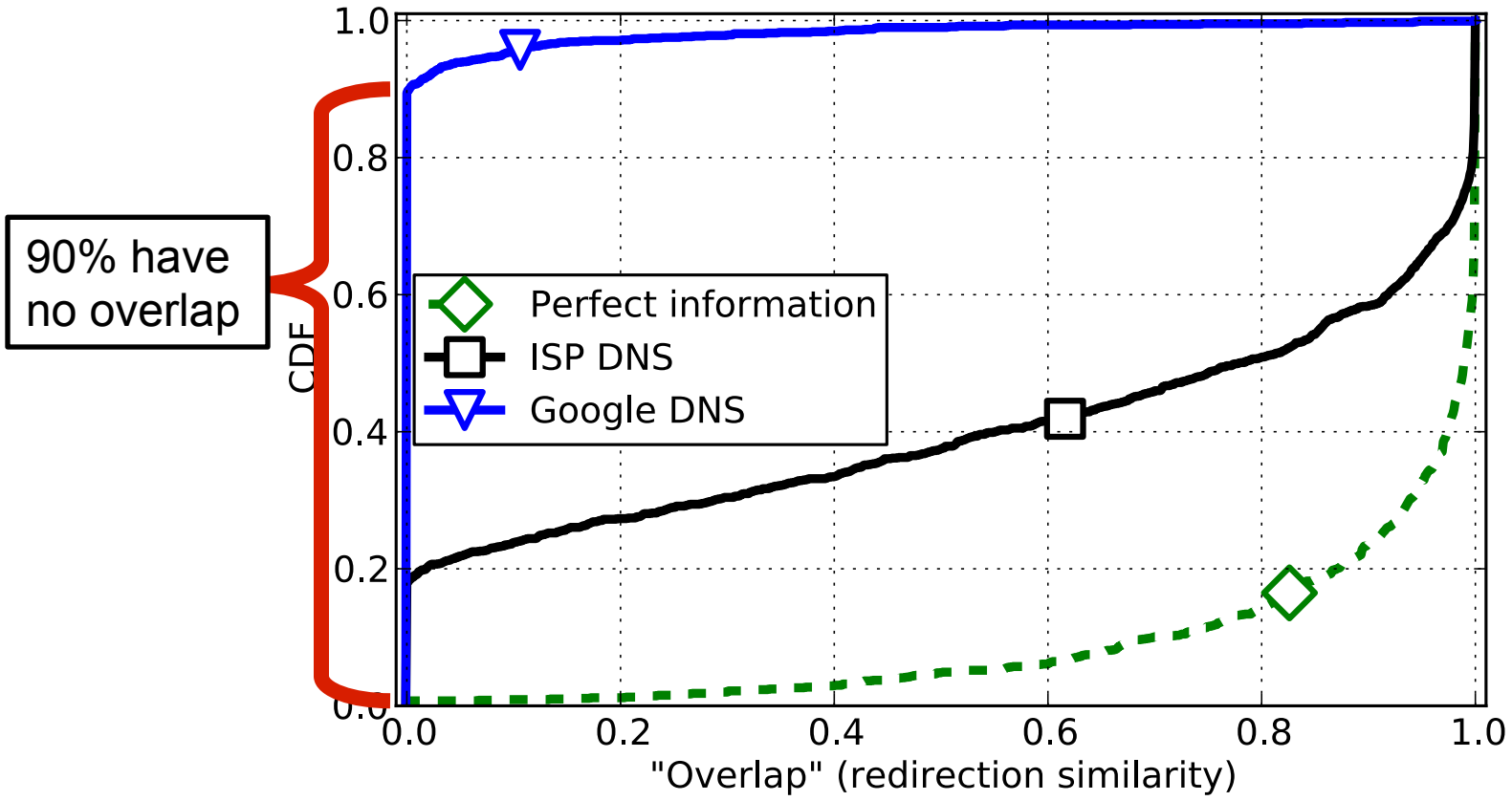
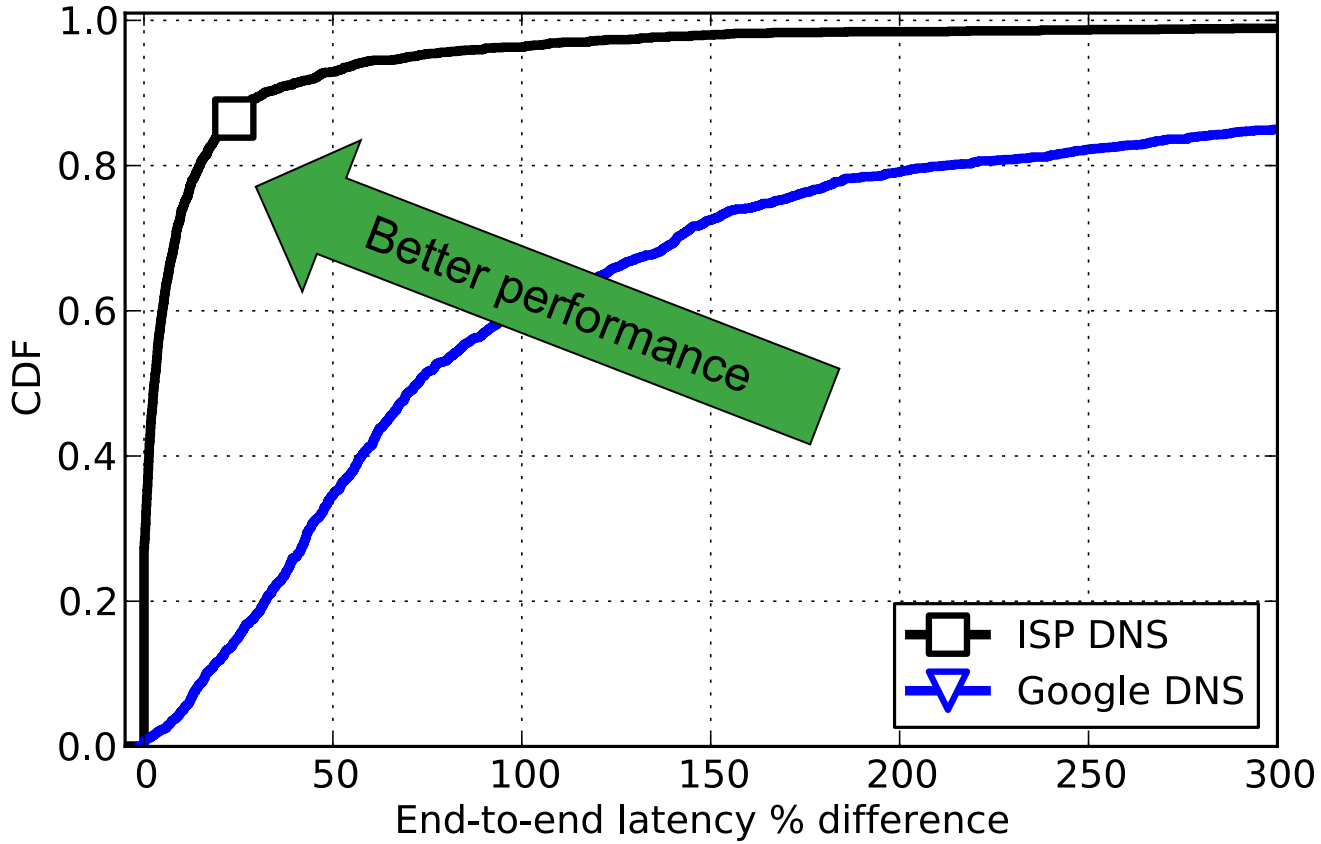


Impact of remote DNS on CDN performance

- Different redirections mean different performance



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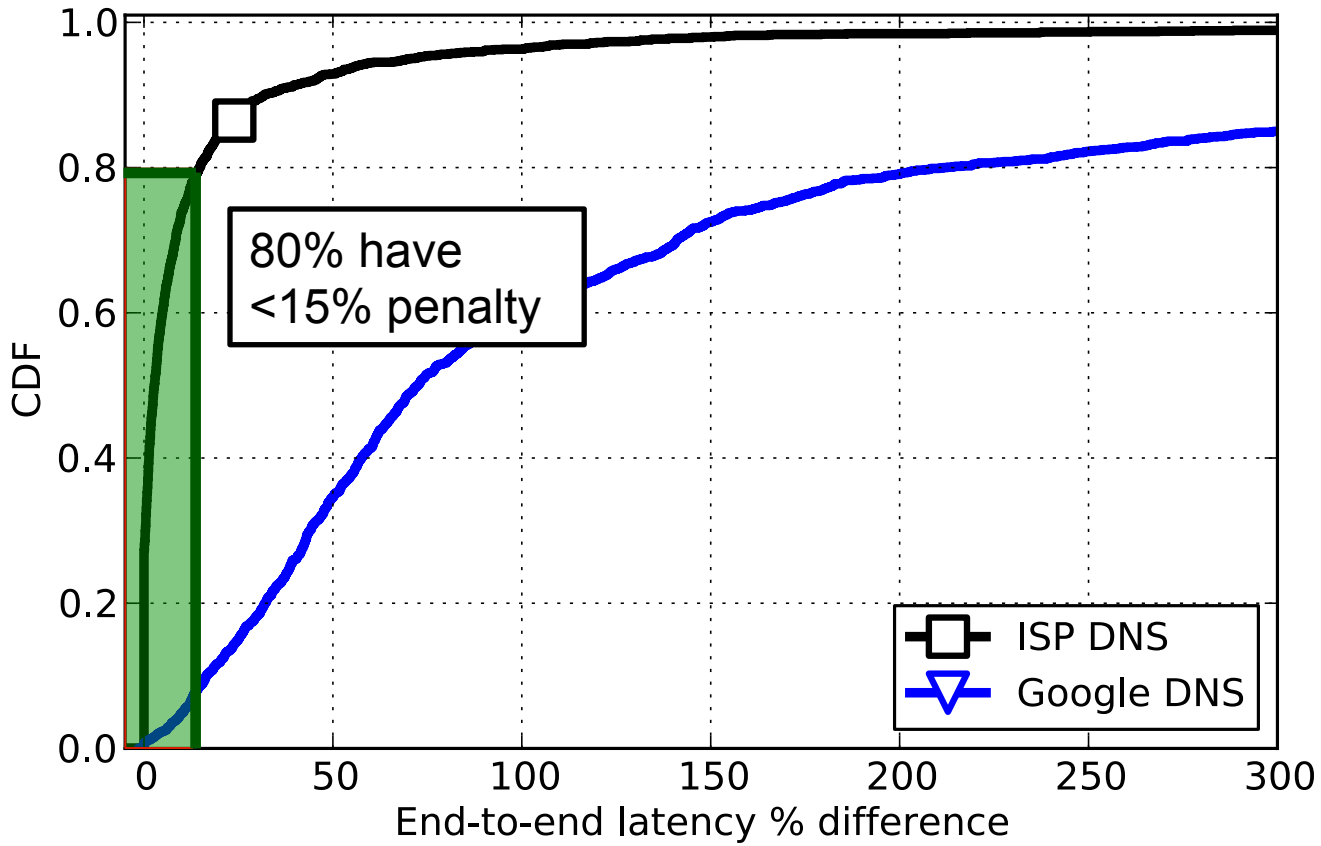

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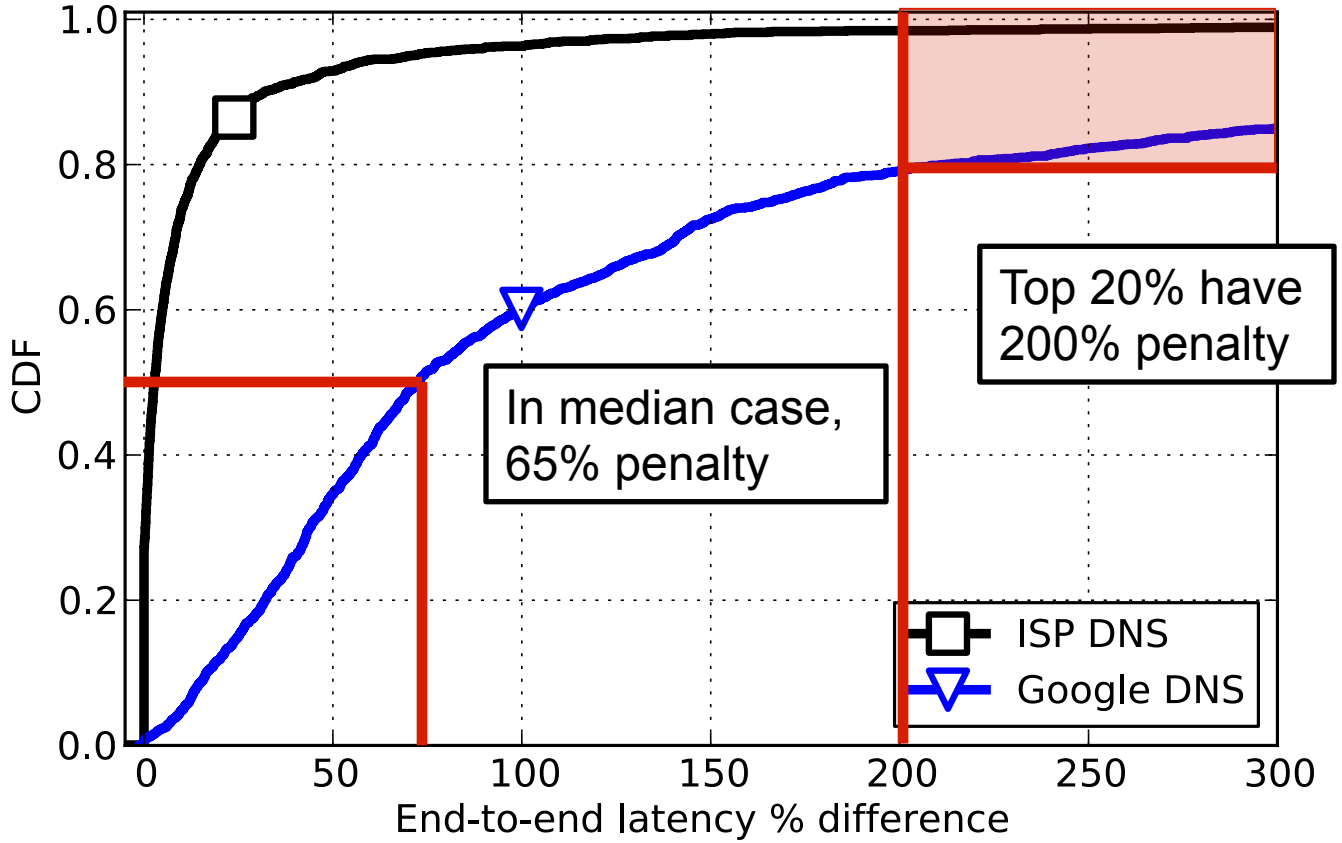
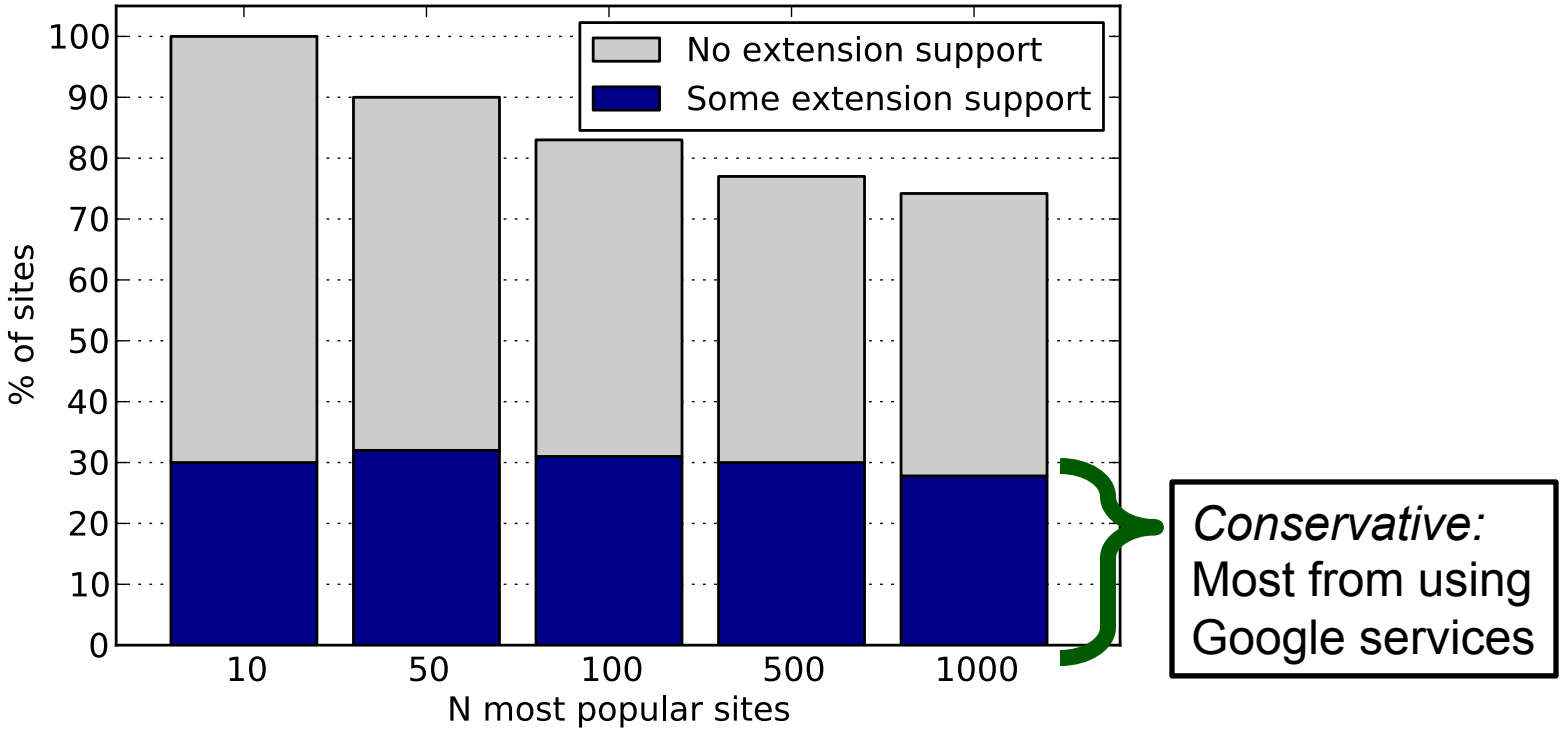


An Industry response – DNS extension

- Resolver sends client's subnet to CDN's authoritative DNS
  - Redirections are based directly on client's location
  - DNS extension requires participation of DNS *and* CDN services
- Limited adoption to date

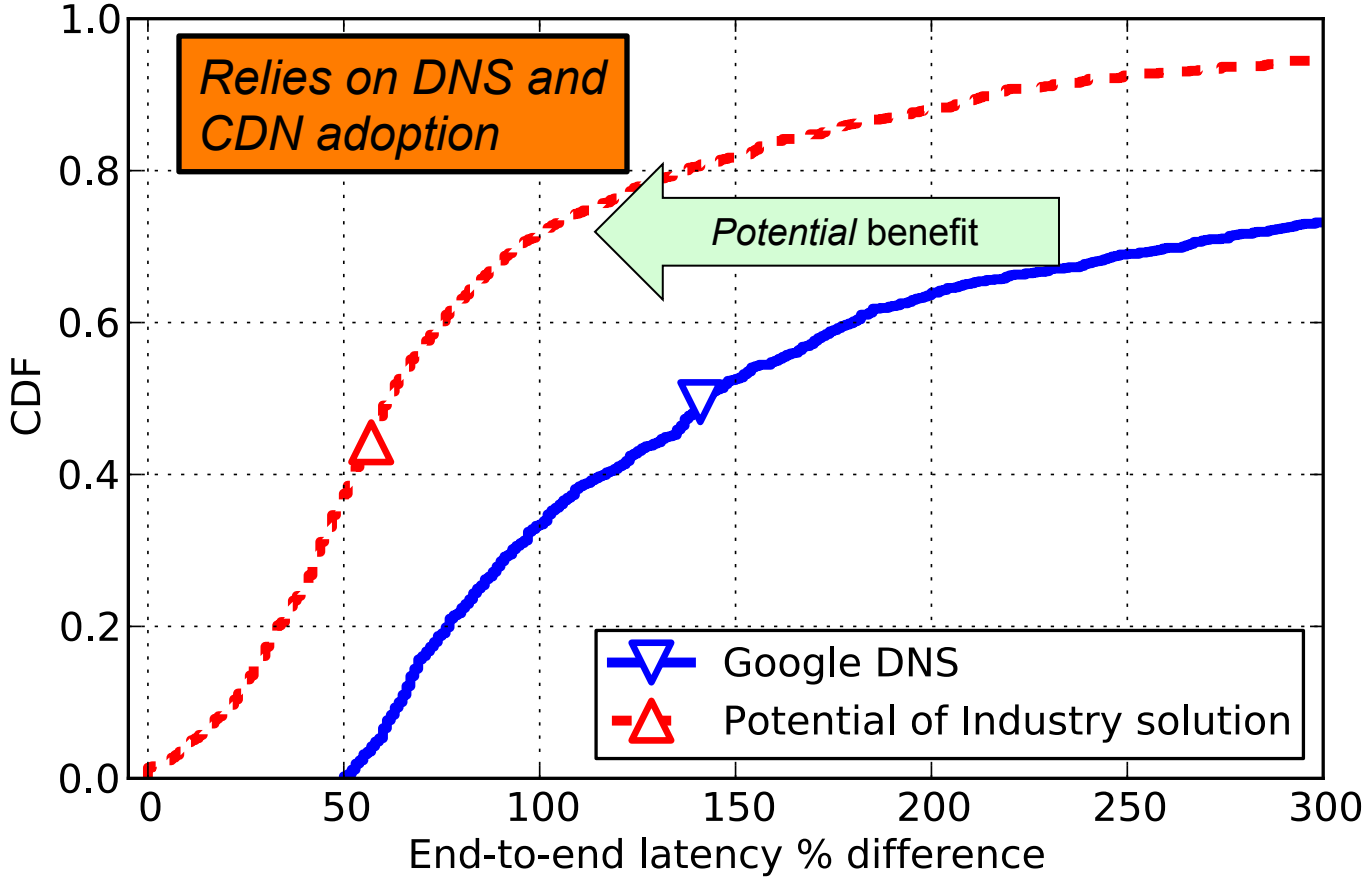


An end host solution – namehelp

- *Forget them! Go for the end host*
  - Colocate client and resolver
  - Act as transparent DNS proxy
  - Obviate need for DNS or CDN cooperation
- Direct resolution
  - Use recursive DNS to translate customer name to CDN
  - Directly query CDN for an improved redirection
- Learning by doing
  - Local caching of CDN's DNS server – avoid extra lookup
  - Only do direct lookup when it improves performance

An end host solution – namehelp

- Focus on places where remote DNS affects performance
- Industry solution has significant *potential* benefit
- End host solution's *actual* benefits are comparable



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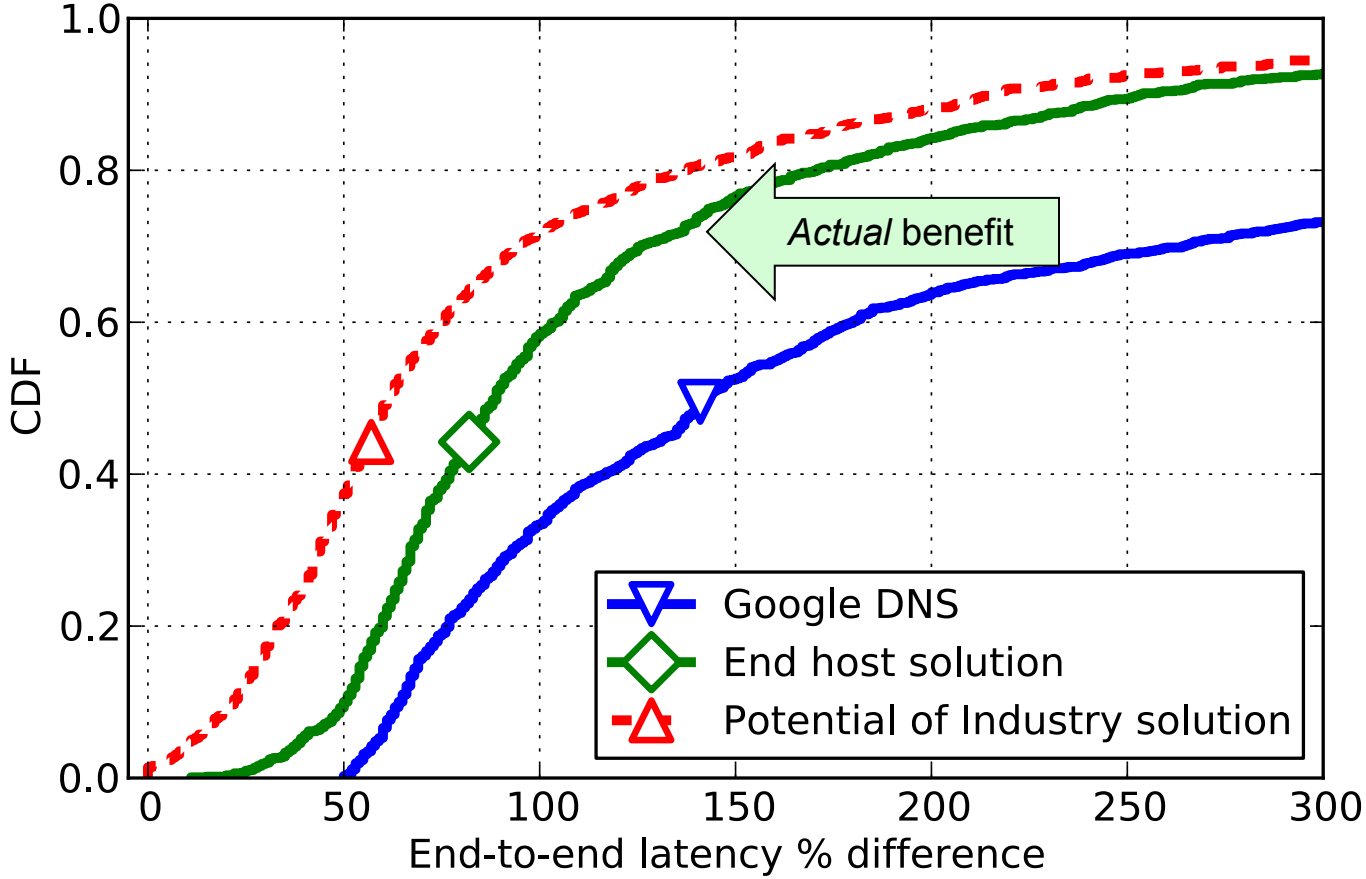

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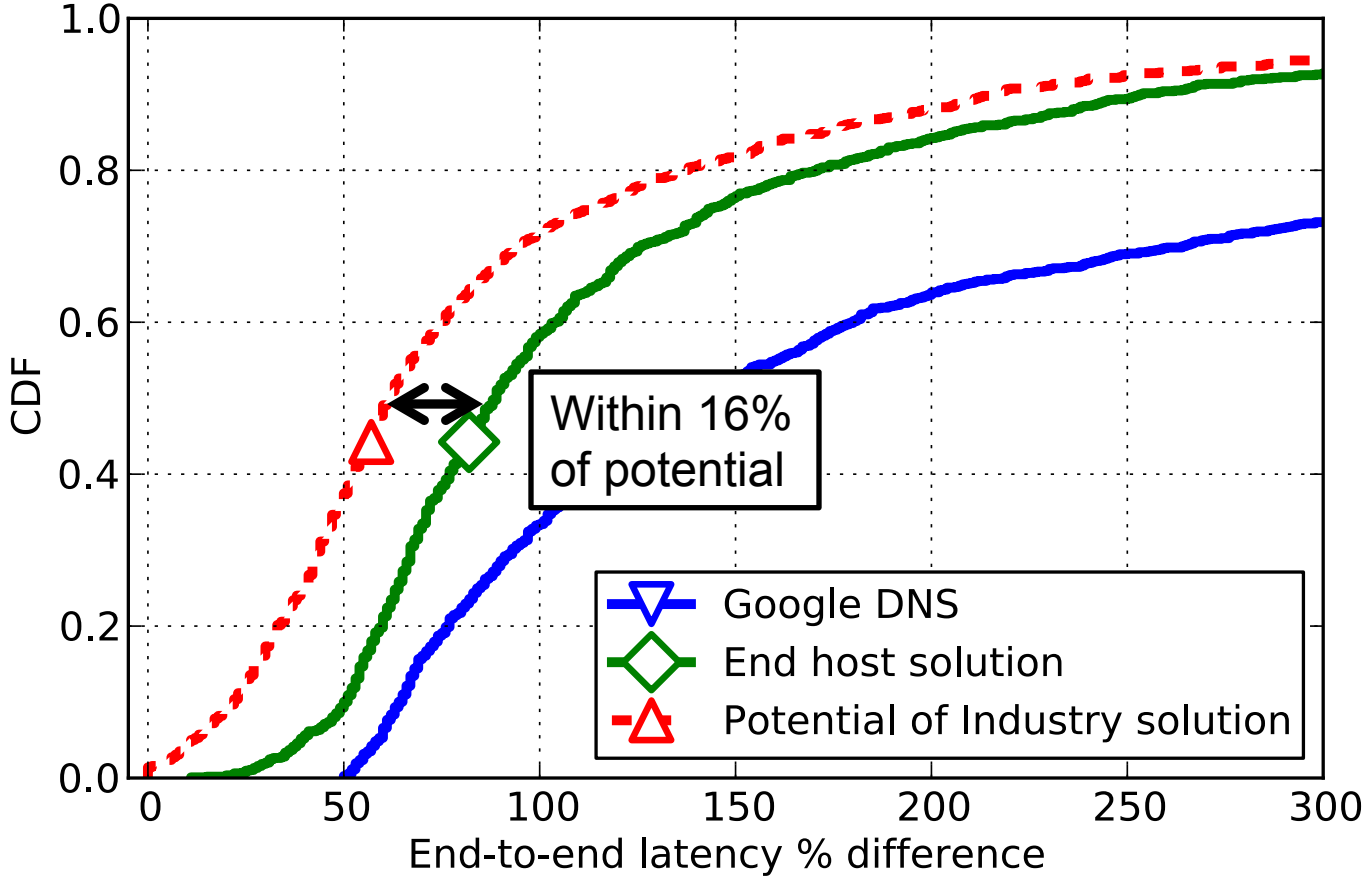

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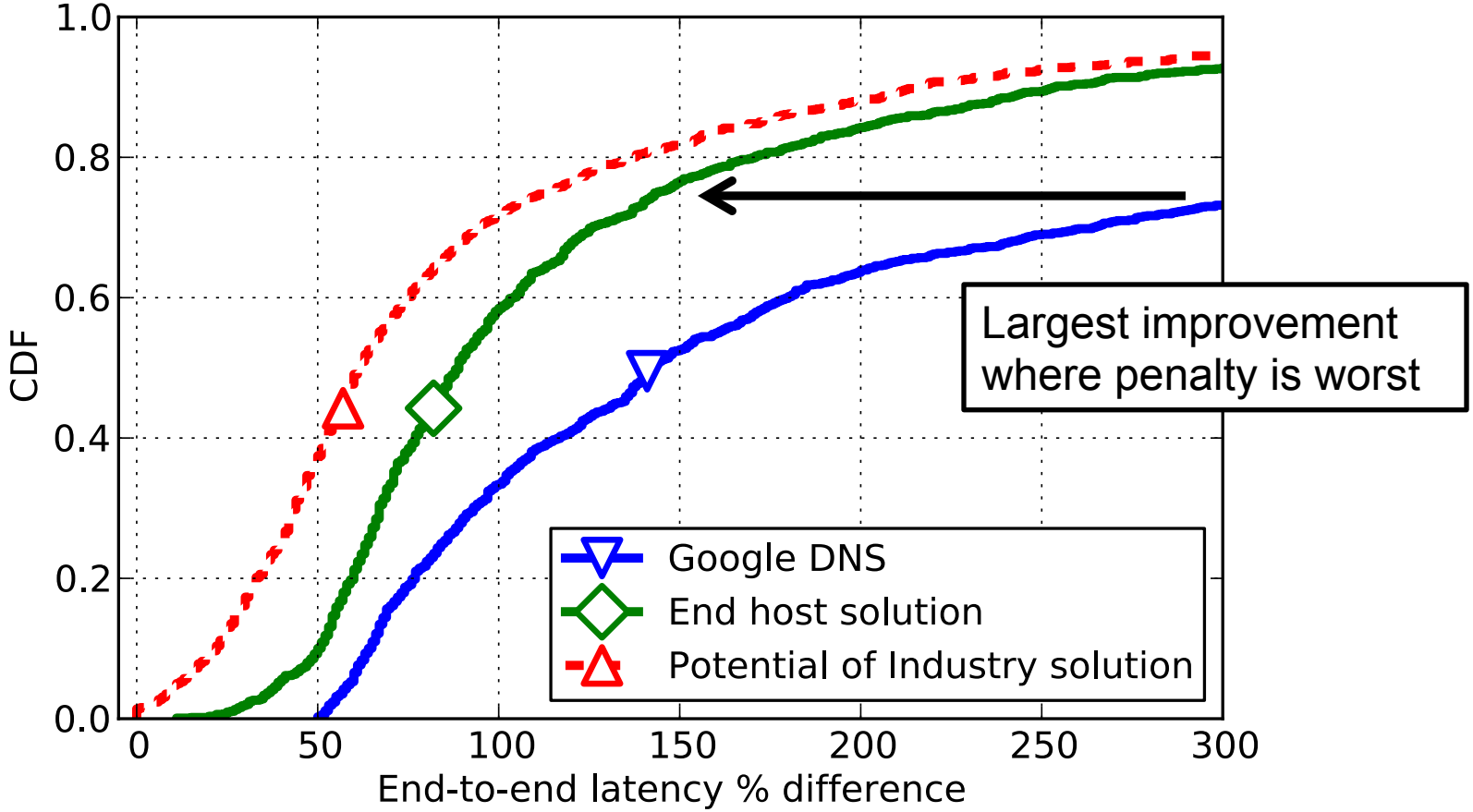

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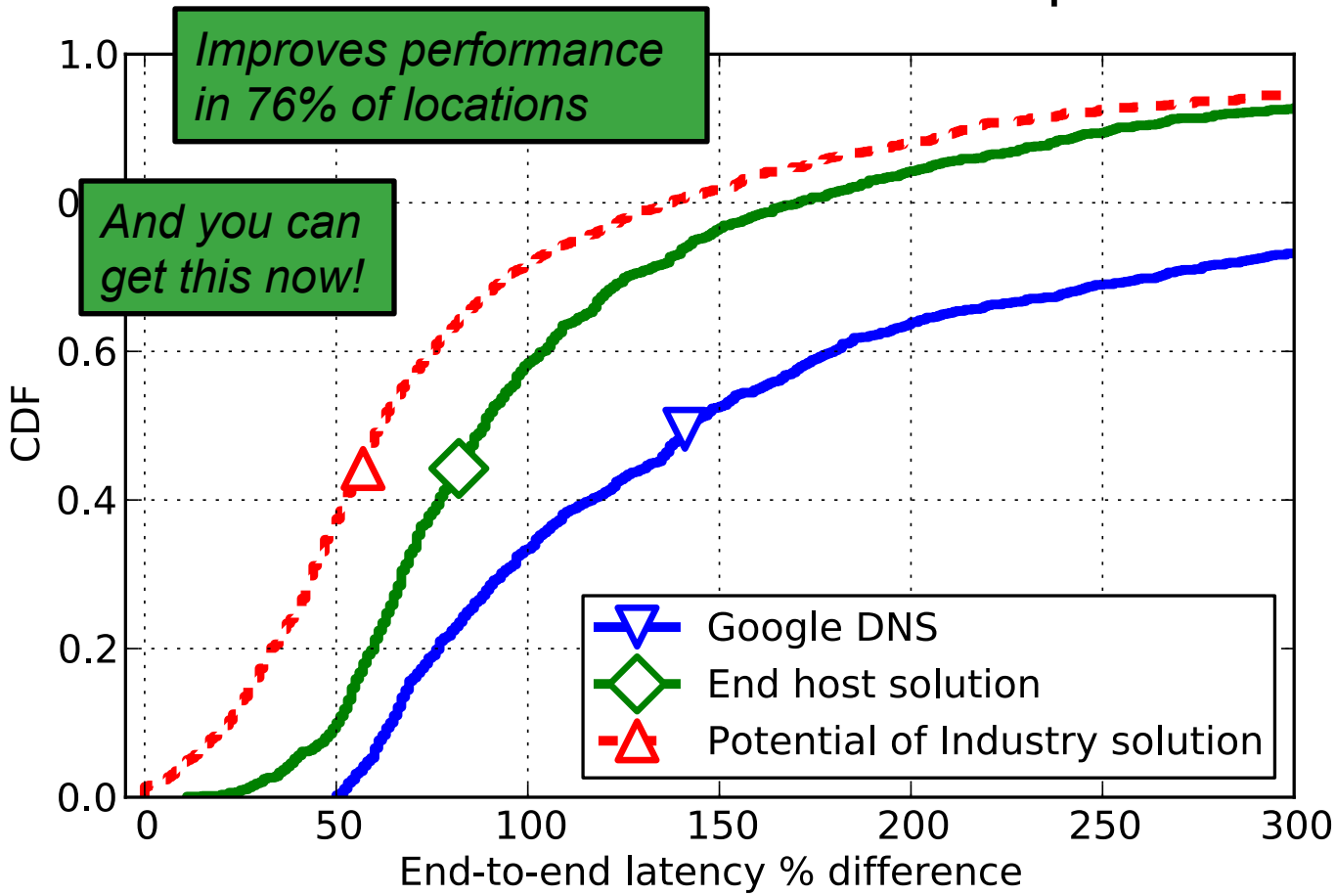

Conclusion

- Working on browser-based and standalone versions
- More to come
  - Selecting the best recursive DNS server
  - Deciding whether to use *direct resolution* technique
- Improve web performance for 76% of affected locations
- Provide insight on DNS's role in web performance
- Questions?