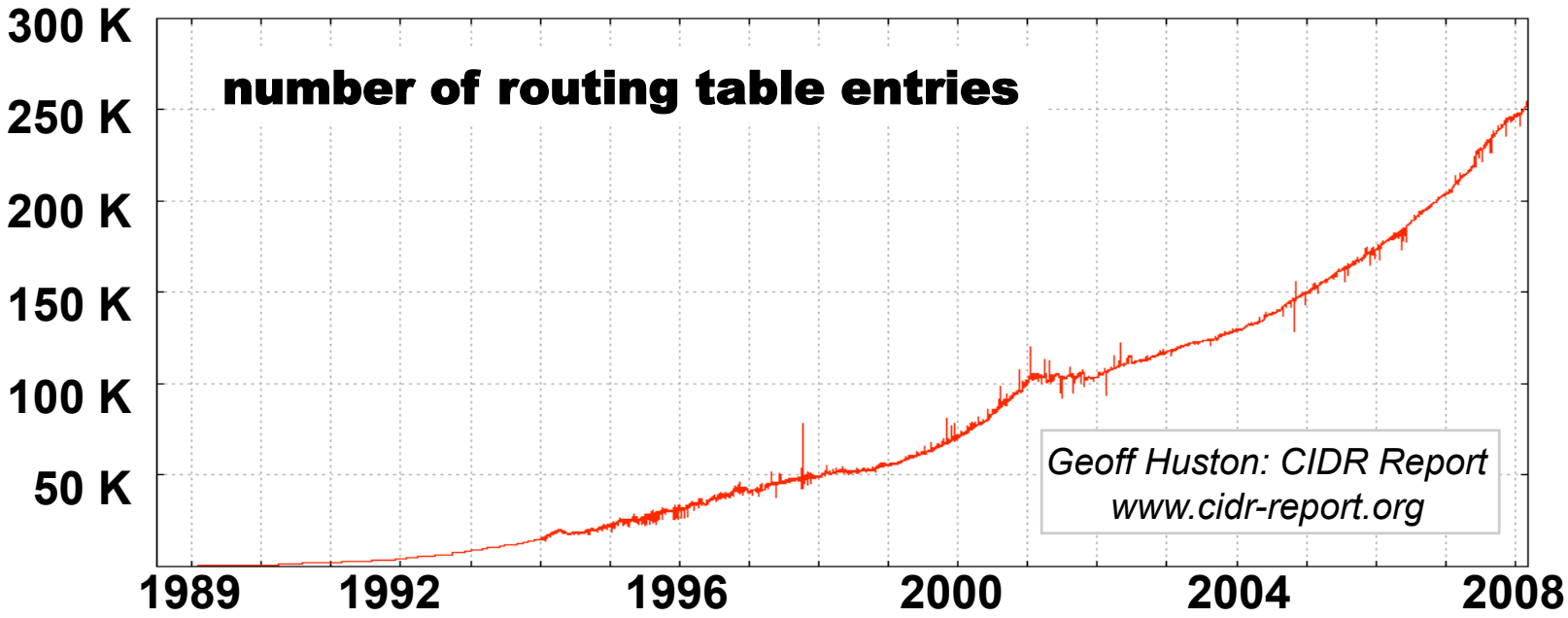
Six/One Router

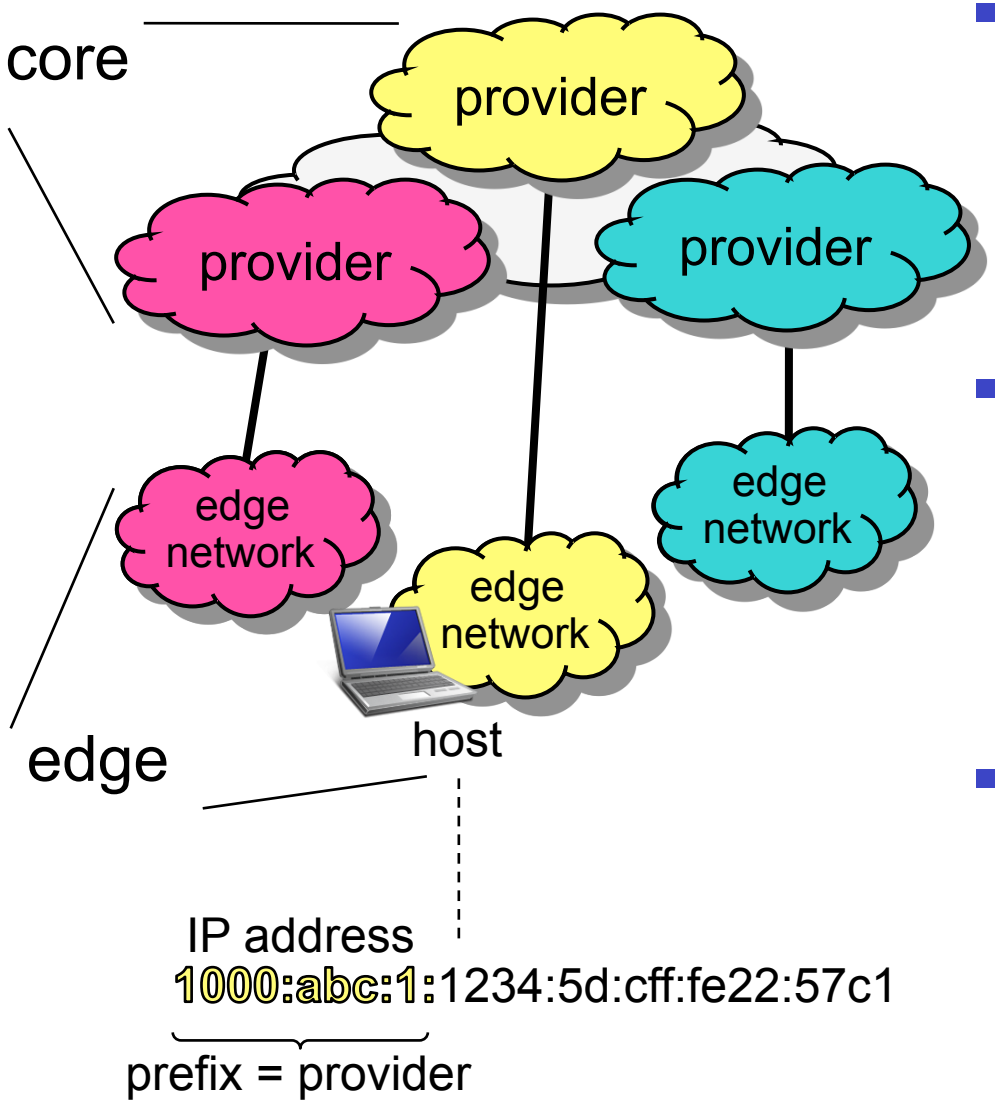
A Scalable and Backwards-Compatible Solution for Provider-Independent Addressing



Christian Vogt, Ericsson

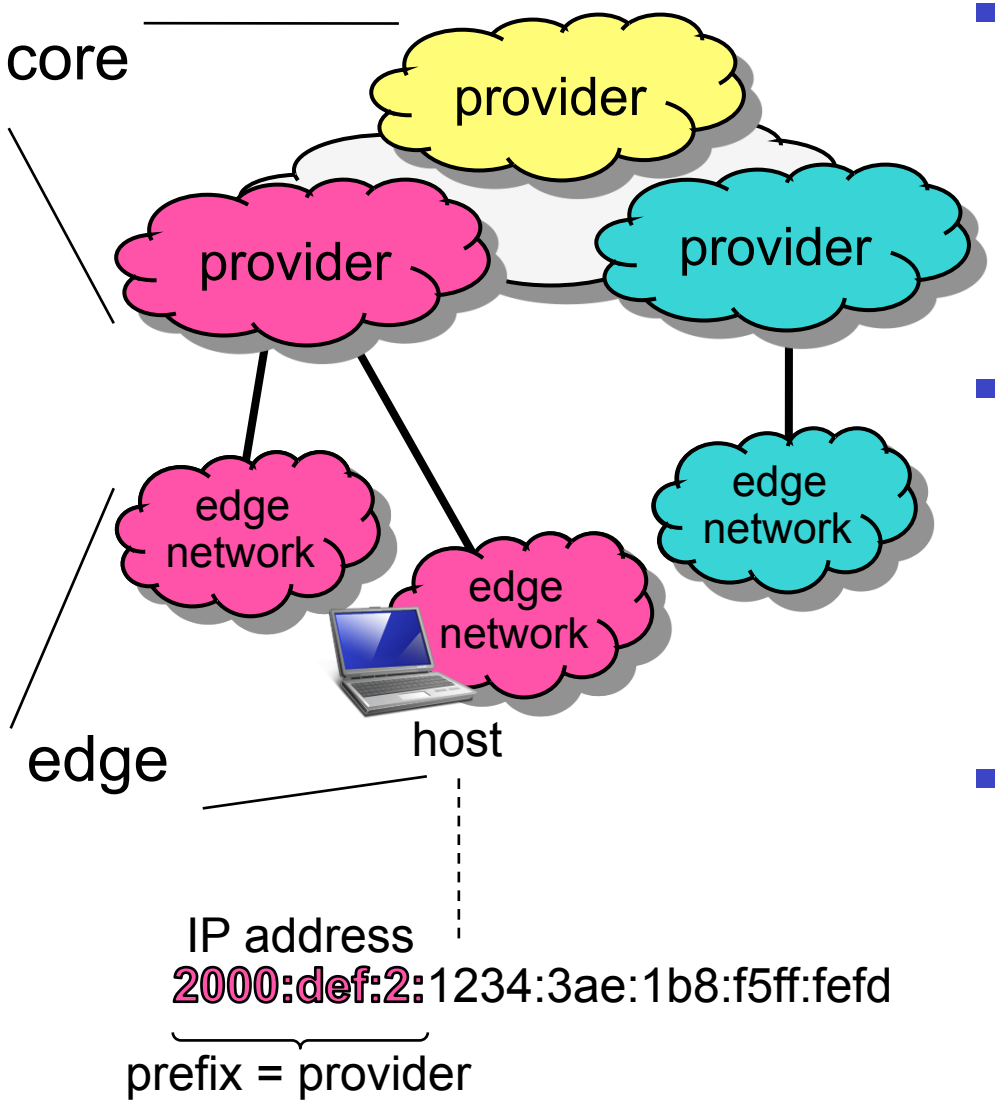
MobiArch workshop, Seattle, August 22, 2008

Towards More Scalable and Flexible Routing



- core: flexible, but not scalable
  - global routing table at every provider
  - track route changes Internet-wide
- edge: scalable, but inflexible
  - provider-allocated addresses
  - renumbering on provider change
  - multi-homing infeasible
- need routing architecture that…
  - is scalable
  - avoids renumbering
  - supports multi-homing

Towards More Scalable and Flexible Routing



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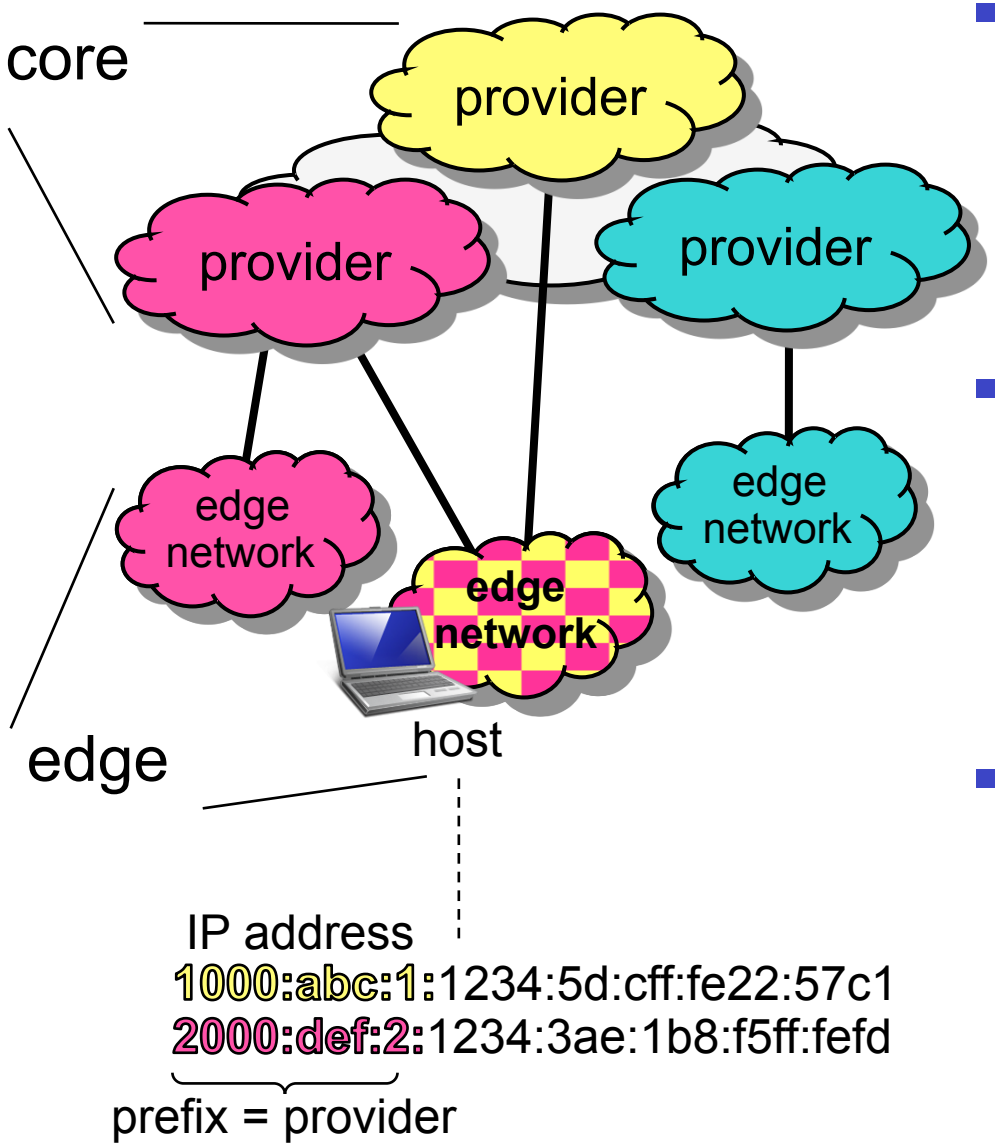

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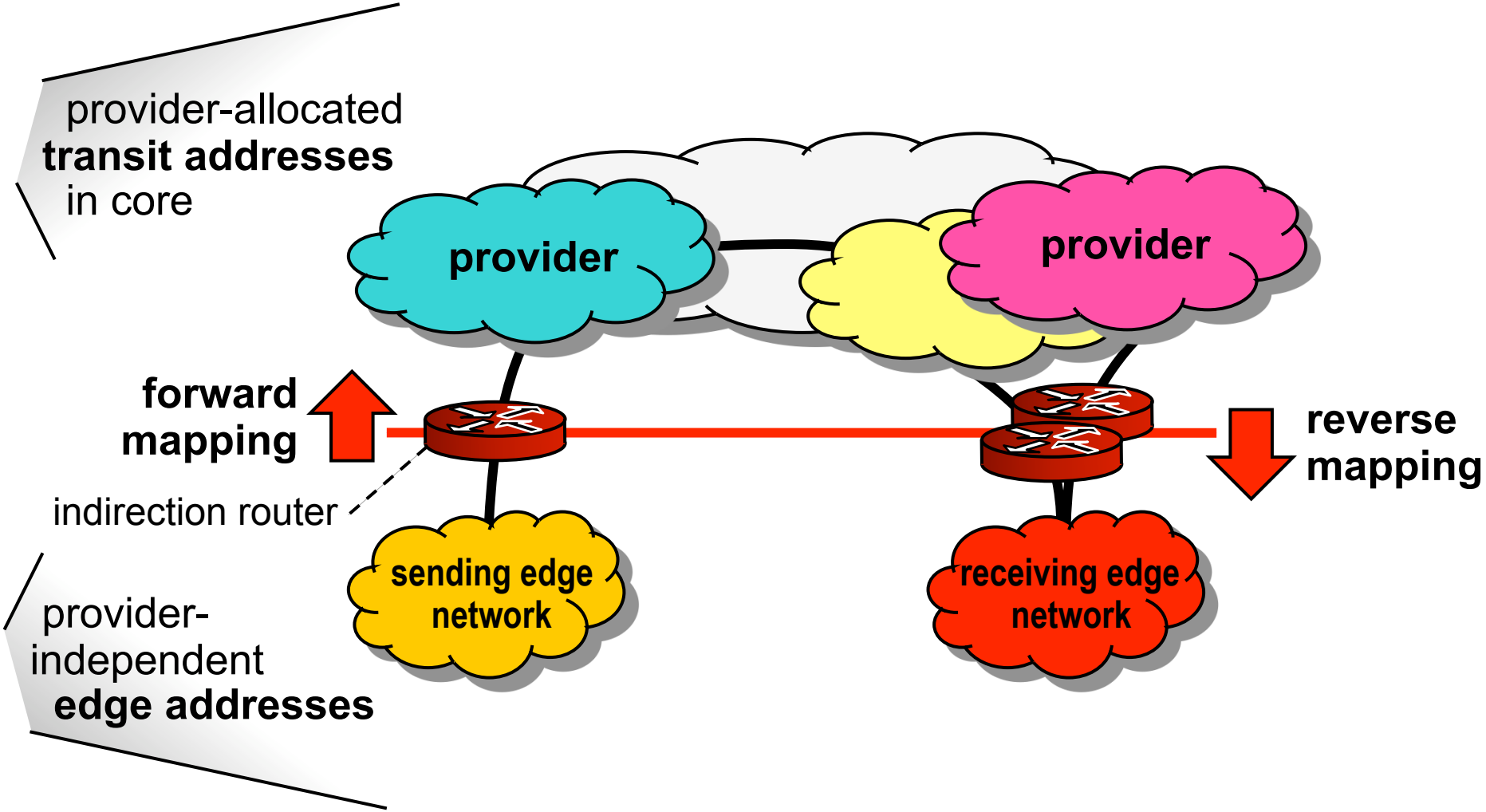
Address Indirection



- decouples addressing at edge from Internet core
- global mapping system for remote edge addresses

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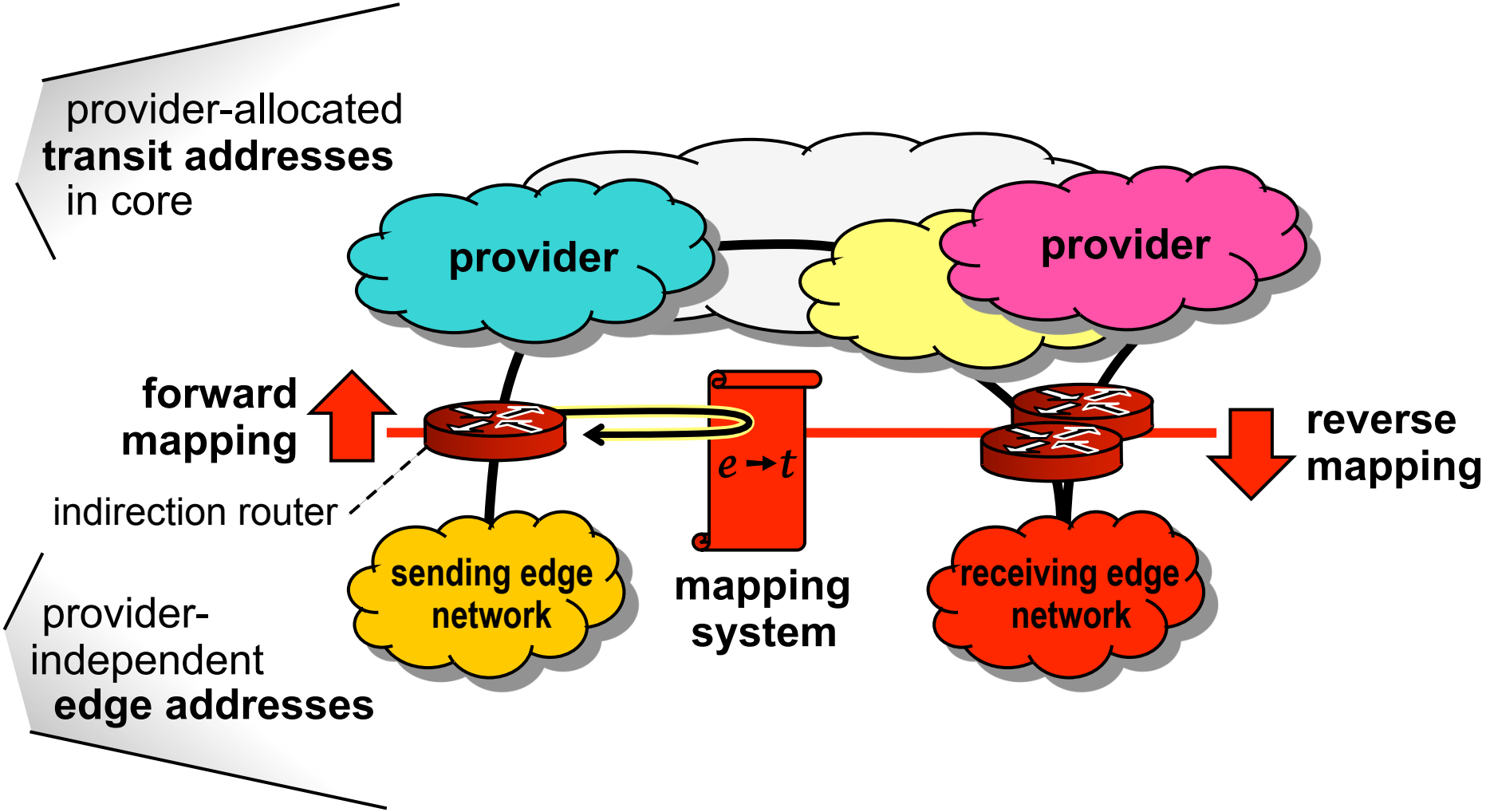

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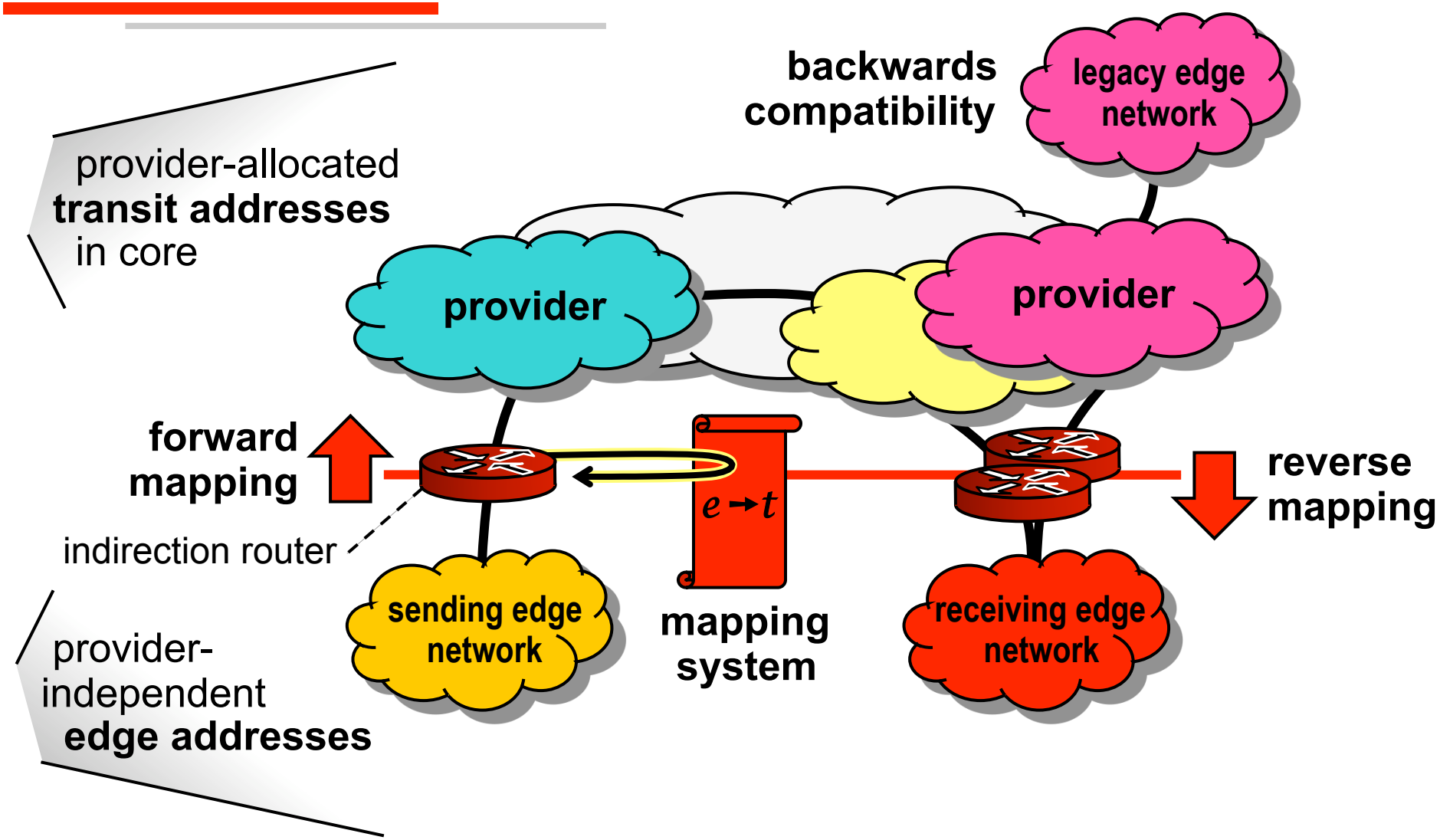

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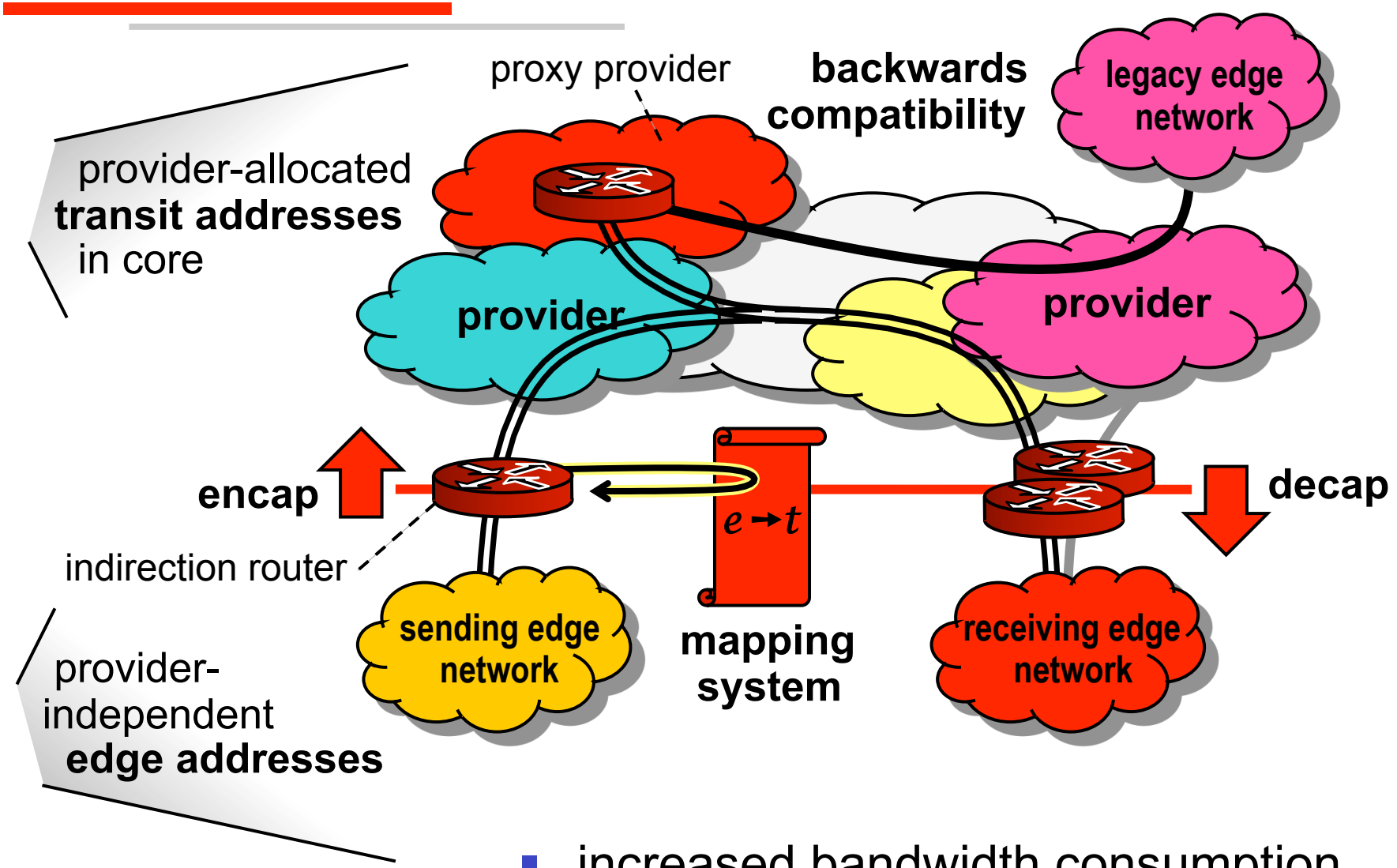
Address Indirection with Tunneling



- increased bandwidth consumption
- prolonged path
- no incentives model for proxies

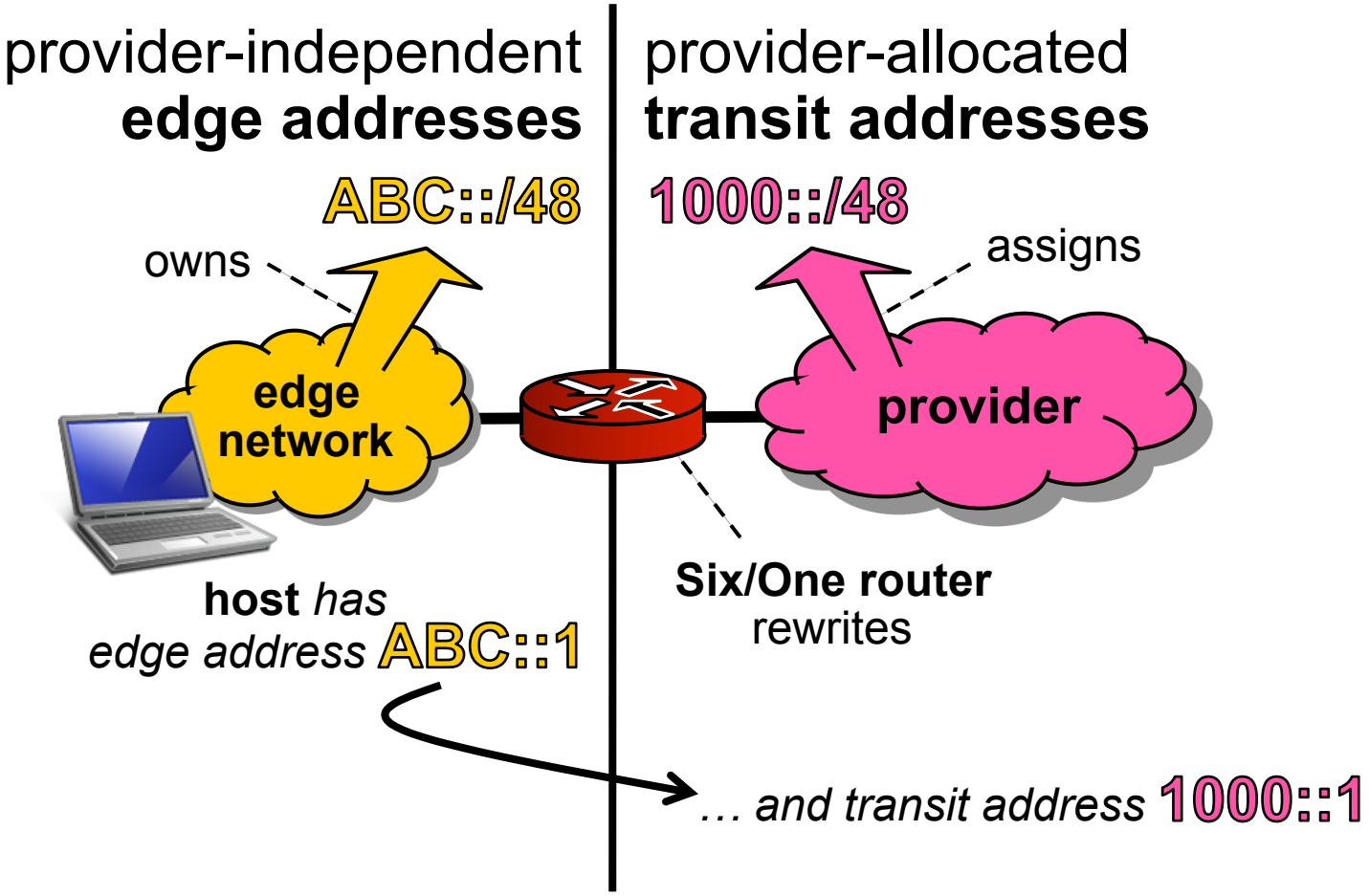
Contribution of Six/One Router

address indirection enabling…

- minimum extra packet overhead
- direct-path routing
- autonomous deployment

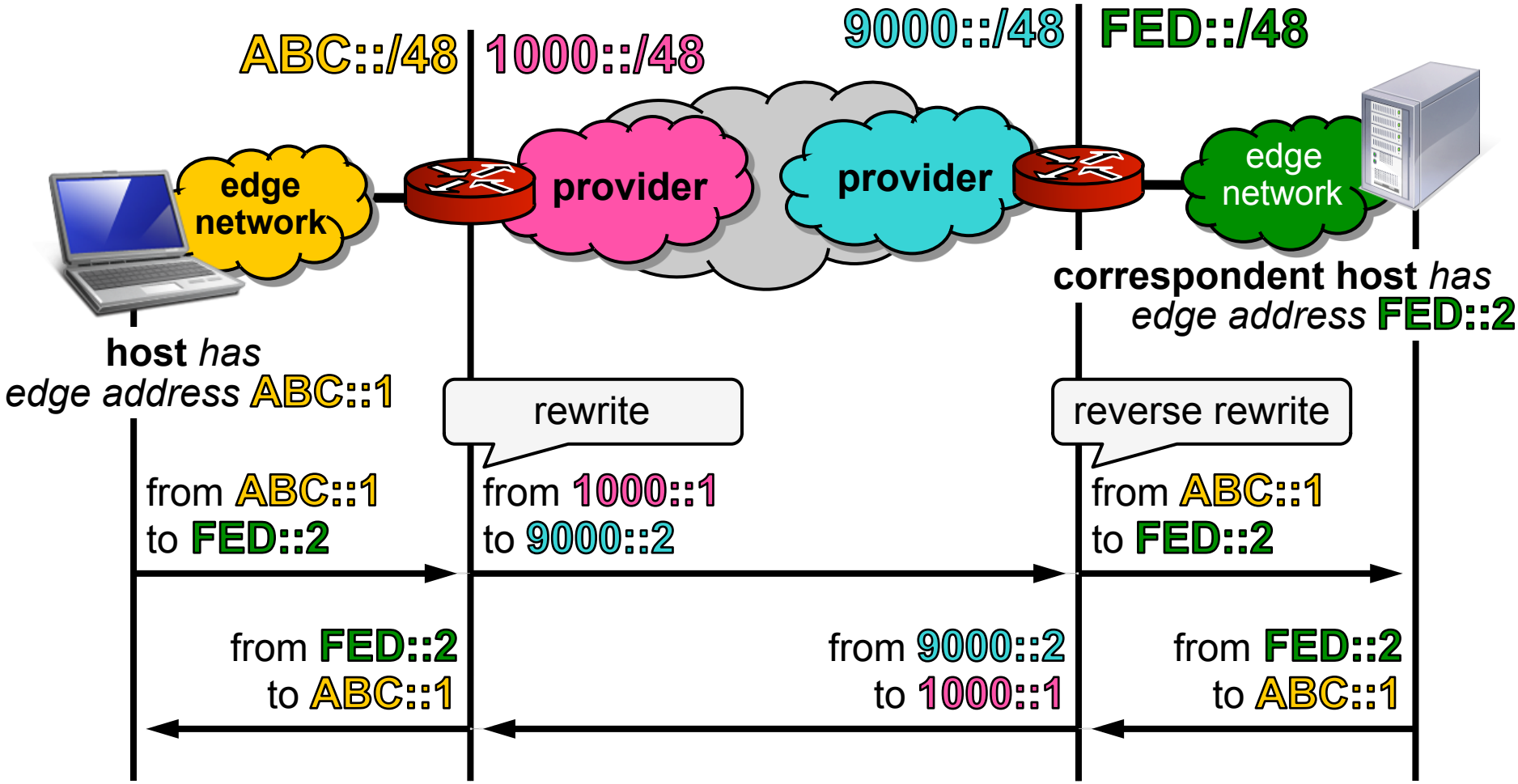
idea: one-to-one address rewriting

Network Setup and Addressing



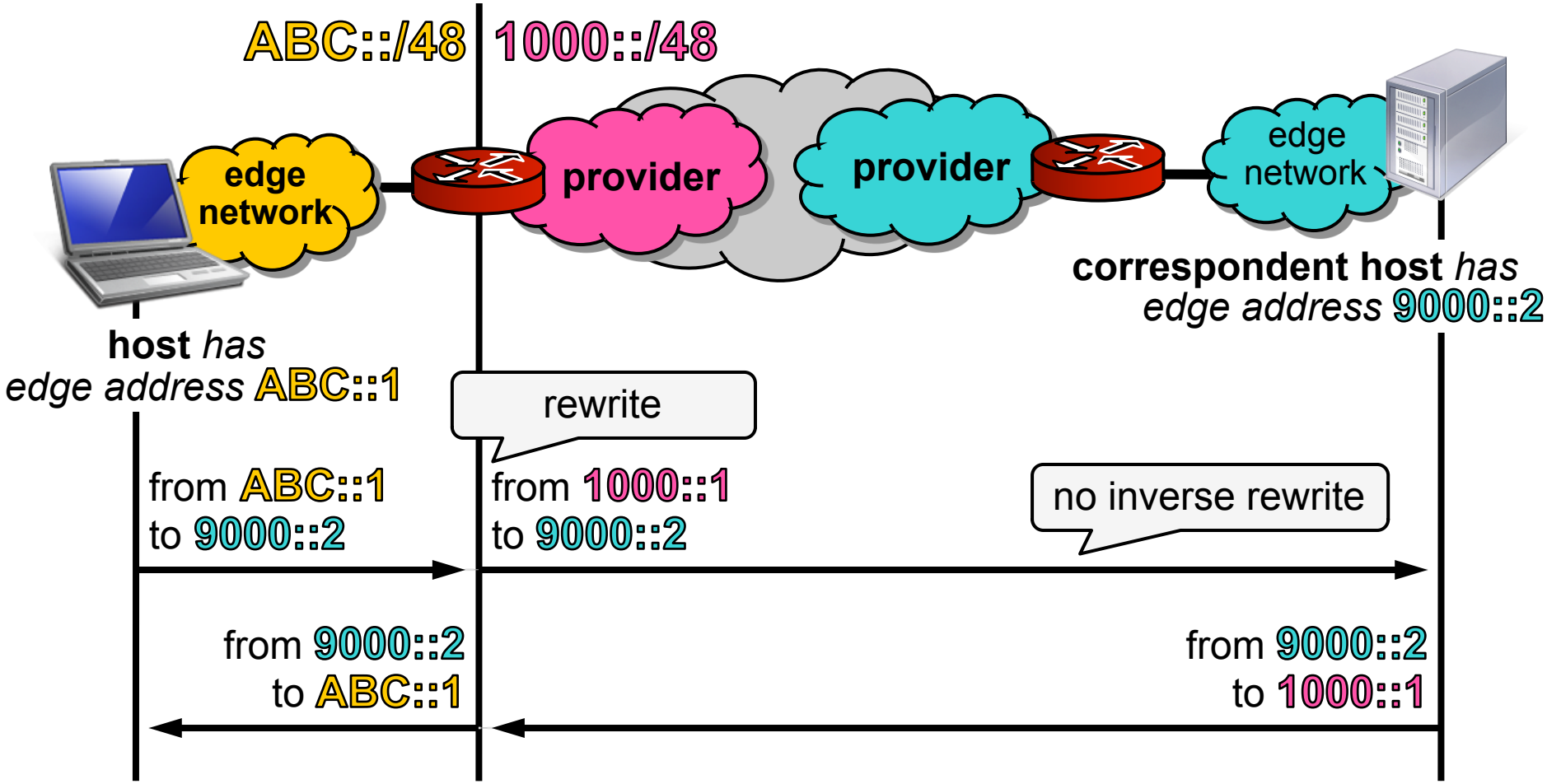
- one-to-one mapping between edge/transit addresses

Address Rewriting



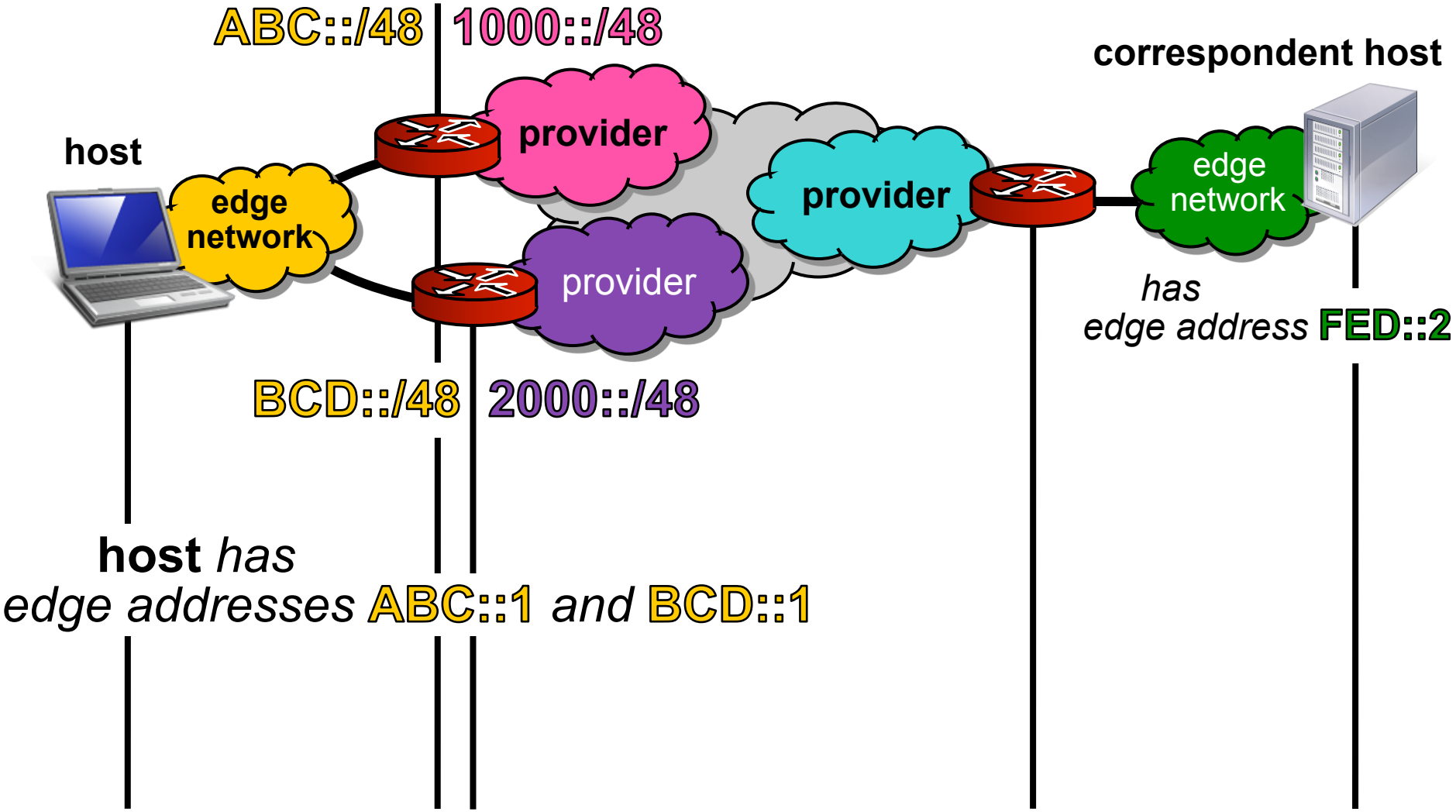
- provider-independence by rewriting local addresses
- transparency through rewriting remote addresses

Backwards Compatibility

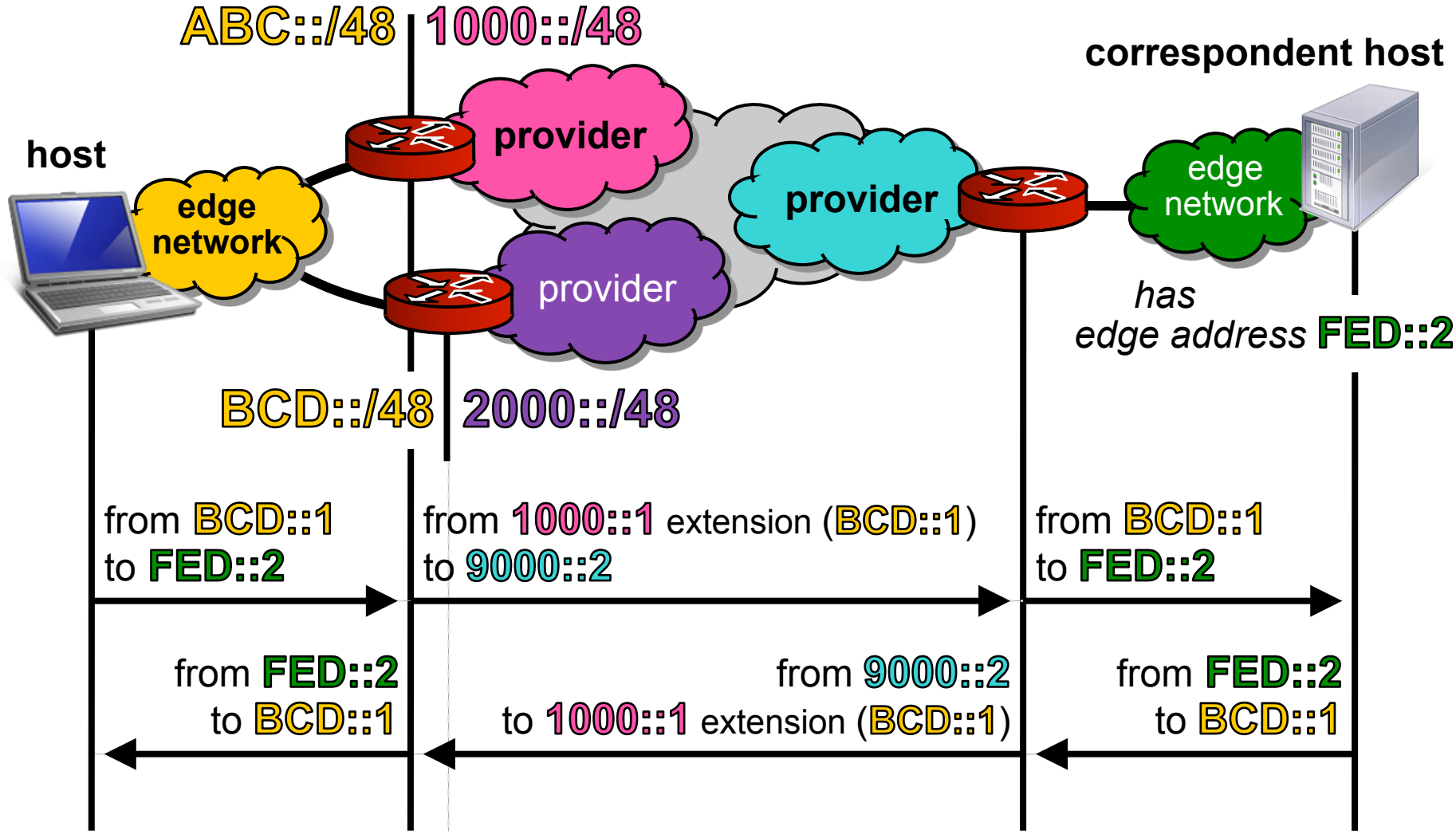


- natural fall-back to unilateral rewriting
- loss of transparency requires NAT traversal support

Multi-Homing Support



Multi-Homing Support



- redirect via packet extension with original edge address

Conclusions

address indirection enabling…

- minimum extra packet overhead
- direct-path routing
- autonomous deployment’

…possible with one-to-one address rewriting

- transparent with bilateral rewriting
- backwards compatible with unilateral rewriting

future work: implementation and experimentation