
A Layered Naming Architecture for the Internet

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Introduction

- Basically a literature survey which gathers existing research and propositions together
 - DNS suits poorly for naming data and services
 - Proposes that naming and resolution should be divided into three layers instead of one
 - 1) services and data become first class objects
 - 2) accommodate mobility and multihoming
 - 3) integrate middleboxes (NATs, firewalls etc.)
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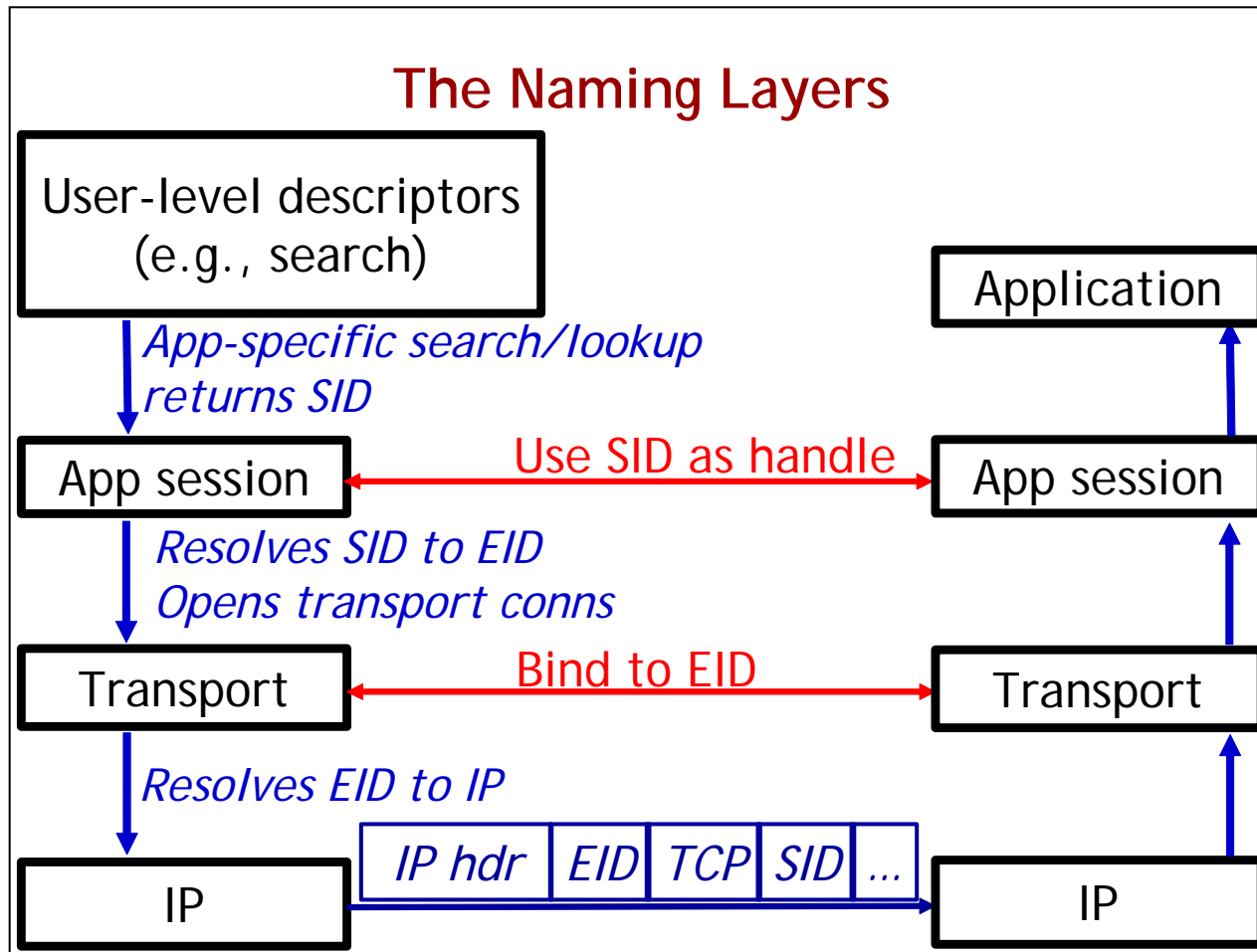
Design Principles

- Names and protocols
 - Namespace and network elements
 - Resolution and delegation
 - Sequences of destination
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Names and protocols

- Names should bind protocols only to the relevant aspects of the underlying structure
 - => Name services and hosts separately
 - Service Identifier (SID): host independent service or data name
 - End-point identifier (EID): location independent host name
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The naming layers



Namespace and network elements

- Names should not impose arbitrary restrictions on the elements to which they refer
 - => Flat namespace!
 - Large flat namespace can be used to name anything
 - Flat namespaces can be scalable resolved in DHTs
 - Flat names are not user-friendly
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Resolution and delegation

- A network entity should be able to direct resolutions of its name not only to its own location, but also to chosen delegates
 - Delegation enables the use of middleboxes such as firewalls and NATs
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Resolution explained

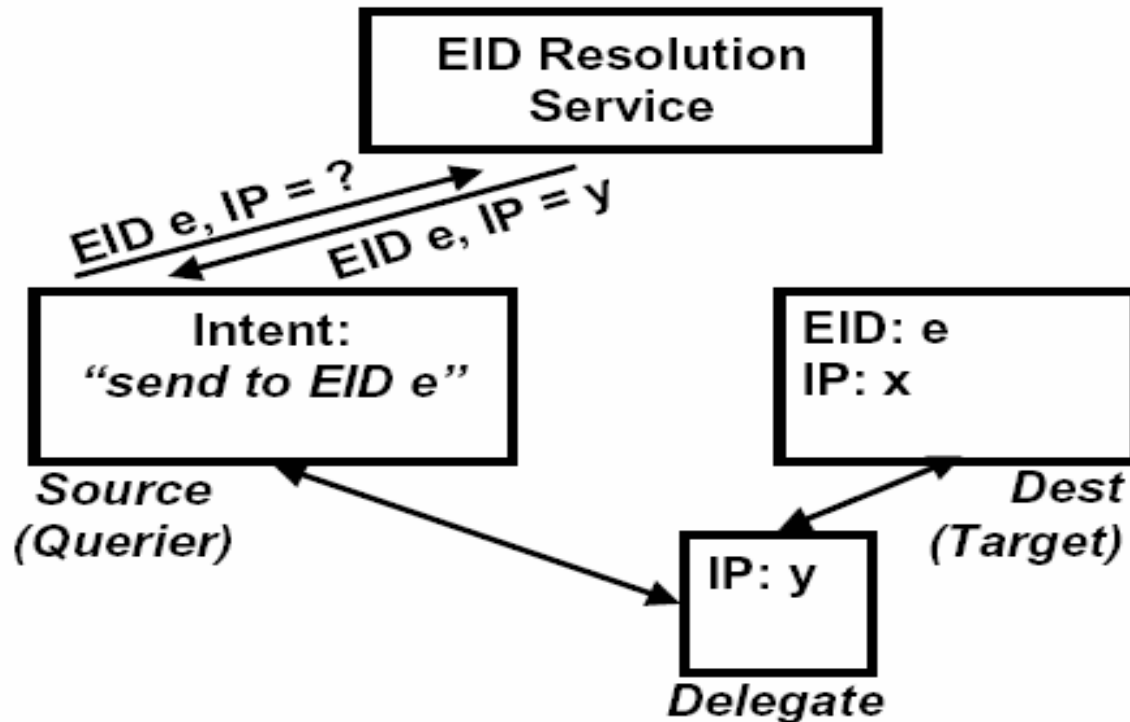


Figure 1: EID-level delegation. A source queries on a given EID and is given the IP address of a delegate. The source could also be given the delegate's EID or multiple EIDs (not shown).

Resolution continued

- Given an application a , host h , service or data which SID is s
 - Application gives s to the SID resolution layer
 - Receives one or more EID triples (EID, transport, port)
 - Example: if s represents a web server, then the triple might be (EID of the web server, TCP, 80)
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Sequences of destination

- Destinations, as specified by sources and also by the resolution of SIDs and EIDs, should be generalizable to sequences of destinations
 - Loose source routing should be available also at the endpoint and service layers
 - Path could be determined by a series of EIDs
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Related work

- Most direct inspiration: HIP + *i*3 + SFR
 - Prototype: Delegation-Oriented Arch. (DOA)
 - EID proposals: Nimrod, HIP, Peernet
 - Mobility/multihoming: Mobile IP, IPv6, Migrate
 - Intermediaries: IPNL, TRIAD, UIP, P6P, MIDCOM
 - SID-like proposals: URNs, Globe, ONH
 - Other architecture proposals
 - PIP, Nimrod, IPv6, Active Networks, ...
 - FARA, Smart Packets, Network Pointers, Predicate Routing, Role-based Architecture
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