Some observations on Location and Identity

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What are we talking about

• Conversations on the list talk of the ID / Locator split
• And people use these terms to mean a number of similar, but not identical things.
• So lets try to be clear about what we are naming, currently, and going forward.
Where am I

• We often talk about locations
  – And we often say that an IP address names an interface
• But we have not even figured out what we mean by “location”
  • We are not exactly naming a spot on a graph
So what location are we naming

• At the very least, an IP address names an IP Interface
  – Which is, by itself, limiting for communication
• But a PA address names more than that
  – It names the provider via which to reach that interface
  – Almost a loose source route
  – If we want source routes, let's use them. Otherwise, let's not?
Identifiers

• We also talk about identifiers.
• These identify something?
  – We are usually deliberately vague about what
  – Some folks talk about naming a fate-sharing entity
• I would like to be able to name the entity with which I am communicating
  – There are already crude application names
  – But there is no way to name the transport stack with which I am communicating
Transport Layer naming

• In order to function, a transport layer protocol needs to be able to recognize which packets are for a particular communication session
• This ought to be independent of what path the packet took to get to the stack.
  – Independent of service provider
  – Independent of IP arrival or transmission interface
• After all, it is the same stack, so clean design would suggest that the naming ought to be the same.
What am I suggesting?

• The IP Address is for delivering packets
  – Make it a field for that purpose
  – Allocate it, always, according to the needs of the forwarding system
• Make transport and above use something else for identifying the session.
  – Yes, we have to help figure out what that something is
  – Yes, it probably needs to look to applications like an IPv6 address.
Why bother?

• If we want a clean system, rather than Rube Goldberg bandaids, we have to start by picking a clean set of components
• And, once we do so, it is much easier to address the needs of the individual parts separately
  – For example, many of the benefits sited for LISP would apply inside sites as well, if hosts were not concerned with their paths.
Benefits of Separation

• We can discuss the separation of path selection from party identification.
  – I want to talk with CNN. Now how do I do that?

• If we are careful, we can enable a number of alternative path management techniques
  – Oracles
  – Host based multi-path communication
  – Because the IP address will deliver, and the transport identification will bind identity
Possible approach

• What if we explicitly name the communicating entity, and exchange that name as part of the initial communication
  – A machine can run multiple entities
  – Or an entity can span machines
  – Or both...

• Running multiple instances of protocols on top of the network layer becomes cleaner, since each stack can be named
Back to the point

• Get Transport and IP untangled
  – Using the IP address in the pseudo-header was natural and reasonable when it was done
  – We know better now
  – Continue a bad practice, just because it was done historically, is a bad practice

• Location and Identity have differing constraints and goals
  – Decoupling the two allows the needs to be met
Opinionated comments

• As far as I can tell, the LISP “EID” is still naming a location. It is a scoped location, which is better than nothing. But it is NOT a clean identifier to build on
  – LISP may be a useful way to build large virtual networks on a constrained IP v4

• We can still change the hosts
  – And we have to if we are going to actually make a difference
Credits

• This presentation was prompted by, and owes thanks to, many discussions with Ran Atkinson.
  – However, I get the blame and the rotten tomatoes.
• I found the MobiArch paper from University Catholique de Louvain, Belgium by Quoitin, Iannone, Launois, and Bonaventure to be very helpful
  – I think their points are actually stronger when applied to a full separation of transport and network, rather than just LISP.