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Characteristics of Names

- ↳ Ex: difference between IP addresses, hostnames, MAC addresses, etc.
- ↳ **Uniqueness**: globally unique, unique in some context (locally unique), probabilistically unique, not unique
- ↳ Length
- ↳ User friendliness - human readable
- ↳ alphabetics vs. binary
- ↳ moderate length vs. long
- ↳ memorable vs. not memorable
- ↳ easily transcribable vs. more difficult
- ↳ Hierarchical vs. Flat
- ↳ Assigned from a central authority vs. distributed

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Naming and Change

- ↳ Naming only matters because things change
 - ↳ if no change, things can be hard-coded
 - ↳ Ex: users/services/machines move, processes start and stop, etc.
 - ↳ mobile hosts, web services, both for content and virtual hosts (multiple websites on single computer), load balance

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Terminology

- ↳ **Name**: what you want
- ↳ **Address**: where it is
- ↳ **Route/path**: how to get there
- ↳ **Binding**: process of mapping a name to an address
 - e.g., DNS maps host name to IP address, DHCP maps MAC address to IP address, C library call maps service to port, maps MAC address to interface
- ↳ **[Context]**: the state needed to do binding

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Key Ideas

- ↳ Defining the terms (objects) for naming
- ↳ **Binding**: mapping names to addresses
- ↳ Give characteristics of names

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Context

- ↳ 1982: fairly early on in the net
 - ↳ Ethernet only a few years old
 - ↳ basic networking terminology still evolving
 - ↳ background for routing (next class)

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CS551

On Naming (RFC 1498)

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<http://merlot.usc.edu/cs551-f12>

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Nodes vs. Interfaces

- What does an IP address identify?
 - = interface (network attachment point), not a node
- Why?
 - = to control where the packets go
 - = so firewall rules can tell "inside" from "inside"
- Problems?
 - = sometimes you want to get to the node and an interface is too specific (e.g., if it's down)
- More on naming in CS555

The diagram illustrates a network topology. On the left, a cloud labeled 'Internet' is connected to an 'ISP router' with IP address 8.1.1.2. This router is connected to a 'DSL link' with IP address 8.1.1.3. The DSL link connects to a 'my router' with IP address 10.0.254. This router is connected to an 'internal LAN' which contains two devices: a 'my PC' with IP address 10.0.2 and a 'my laptop' with IP address 10.0.3.