Identifying Nodes in ICMP Extended Errors

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What’s the problem?

More and more deployments are assigning only a single IPv4 address to routers (instead of one address per interface), and duplicating addresses used throughout the network due to scarcity.

An extreme example from draft-chroboczek-intarea-v4-via-v6:

```
$ traceroute -n 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 64 hops max, 52 byte packets
  1  192.168.0.1  1.894 ms  1.953 ms  1.463 ms
  2  192.0.0.8  9.012 ms  8.852 ms  12.211 ms
  3  192.0.0.8  8.445 ms  9.426 ms  9.781 ms
  4  192.0.0.8  9.984 ms  10.282 ms  10.763 ms
  5  192.0.0.8  13.994 ms  13.031 ms  12.948 ms
  6  192.0.0.8  27.502 ms  26.895 ms
  7  8.8.8.8  26.509 ms
```
**Existing solutions**

RFC5837 - Extending ICMP for Interface and Next-Hop Identification - allows inserting information about incoming and outgoing interfaces into an ICMP error.

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<thead>
<tr>
<th></th>
<th>ifIndex</th>
<th>ifName</th>
<th>ifAddr</th>
<th>MTU</th>
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<tbody>
<tr>
<td><strong>Incoming Sub-IP</strong></td>
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<td><strong>Incoming IP</strong></td>
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Limitations of RFC5837

● Addresses MUST be of the same family as the packet
  ○ E.g., RFC5549 deployments, with IPv6 nexthops for IPv4 routes, do not have an address assigned to the interface that can be used.

● Addresses require another lookup to determine node name
Proposal


Add more information types like those specified in RFC5837:

- An IP address of appropriate scope (“globally-unique” is the most obviously appropriate)
- A node name
Workarounds

- Violate MUST in RFC5837, and include an IPv6 address when responding to an IPv4 packet
- Play fast and loose with “other human-meaningful name” wording from RFC5837; this interface is named “TwentyFiveGigE1/0/13@be2264.ccr22.sjc01.example.com”

The interface name MAY be some other human-meaningful name of the interface.
Next steps

Gauge interest

Apply for code point