There and *Not* Back Again

Or How to Stop Route Leaks
Motivation

- Desire to improve security (SIDR’s BGPSEC)
- Known problem
- Lack of definition is hampering efforts
Comedy of Errors

- “What’s a route leak?”
- Chicken & egg issue
- Tends to immediately rat-hole
Getting It, Backwards

- What isn’t a Route Leak?
- What should *not* be announced?
- Where should leaks be identifiable?
What a Route Leak Isn’t

• Concept of “Customer” – does not need *need* to be defined strictly!

• Customer is a “universal donor”
  – Everyone is willing to accept Customer routes

• Customer is a “universal recipient”
  – Customers generally want it all

• **Route Leak**: sending a non-customer route to a non-customer neighbor
Neighbor Categories are Key

• The categories are per-neighbor-instance
• Superset of (and consistent with) local policy
• Four types based on local-remote relationship:
  – Peer – Peer
  – Customer – Transit
  – Transit – Customer
  – Mutual-Transit – Mutual-Transit
• Based on whether non-customer routes ok
• Based on, but independent of, “customer” definition!
Route Leaks are not Policy

• There are already lots of tools for doing policy
• Stopping leaks is not really a “local policy”
  – Should not try to re-implement local policy
  – Tools don’t need to be useful to local policy either
  – (But they can be)
• Not “belt + suspenders”; “seat belt + air bag”!
Diagrams – Start Simple
Customer -> All – Good

Diagram showing connections and relationships between "Customer", "Transit", and "Peer" with "Our_AS" at the center.
All -> Customer – Good
Transit -> Transit/Peer – LEAK

Diagram:
- Our_AS
- Transit
- Peer
- Customer

Arrows indicate the flow or relationship between the nodes.
Peer -> Transit/Peer – LEAK
Diagrams – Now with Mutual Transit
Our Customer -> All – Good

- Mutual Transit
- Our_ASN
- Peer
- Customer
All (via MT) -> Customer – Good
Peer -> Any Transit/Peer – LEAK
Transit -> Any Transit/Peer – LEAK
Color Markings and Transitions

• In order to reconcile sent colors vs received colors, certain transitions are needed; to stop leaks, additional filtering is done (red):

- Our_AS → Peer
- Our_AS → Transit
- Our_AS → Customer
- Our_AS → Mutual Transit
New Diagram Details

• In order to combine multiple prefixes from multiple sources, we need an additional element: a RIB color partition

Best-path logic is dictated by local policy.

The color “partition” is merely a Venn-diagramatic convenience.

There is still only one RIB.

We are illustrating that “best” paths inherit color from their IN-RIB, i.e. whatever the received color was.
The BIG PICTURE

- Peer's Transit
- Transit
- Mutual Transit
- Our_AS
- Peer's Customer
- Customer
- customer’s customer
- Transit’s Peer
- Peer’s Peer
- customer’s Peer
Route Leak Blocking Logic

• Expressed as a neighbor-type matrix
• X marks the Leak (block the leak)

<table>
<thead>
<tr>
<th>Source (color)</th>
<th>Dest</th>
<th>Peer</th>
<th>Transit</th>
<th>Mutual-Transit Non-Customer</th>
<th>Mutual-Transit Customer</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer (yellow)</td>
<td>X</td>
<td>X</td>
<td>Yellow</td>
<td>X</td>
<td>Yellow</td>
<td>Yellow</td>
</tr>
<tr>
<td>Transit (yellow)</td>
<td>X</td>
<td>X</td>
<td>Yellow</td>
<td>X</td>
<td>Yellow</td>
<td>Yellow</td>
</tr>
<tr>
<td>Mutual-Transit Non-customer (yellow)</td>
<td>X</td>
<td>X</td>
<td>Yellow</td>
<td>X</td>
<td>Yellow</td>
<td>Yellow</td>
</tr>
<tr>
<td>Mutual-Transit Customer (green)</td>
<td>Yellow</td>
<td>Green</td>
<td>X</td>
<td>Green</td>
<td>Yellow</td>
<td>Yellow</td>
</tr>
<tr>
<td>Customer (green)</td>
<td>Yellow</td>
<td>Green</td>
<td>X</td>
<td>Green</td>
<td>Yellow</td>
<td>Yellow</td>
</tr>
</tbody>
</table>
The Internet Drafts

• There are three drafts in a very early stage
  – Definitions, Requirements, and Proposed Solutions

• Please consider reading them and giving feedback

• The main questions are:
  – Is it safe?
  – Is it correct?
  – Should it be adopted by IDR?
  – Should it be included in SIDR’s scope?
Any Questions?

• Sorry I’m not here in person
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• Thank you, especially chairs, scribes, and volunteers.