ALTO Guidance in Provider-Supplied VPNs

+---------------+          +---------------------+           +---------------------+           +---------------------+           +---------------------+
|  Customer's   |          |     ALTO server     |          |     ALTO server     |          |     ALTO server     |          |     ALTO server     |
|   management  |          |   provided by NSP   |          |   provided by NSP   |          |   provided by NSP   |          |   provided by NSP   |
|  application  |          |                      |          |                      |          |                      |          |                      |
|  (ALTO client)|          |                      |          |                      |          |                      |          |                      |
+---------------+          +---------------------+           +---------------------+           +---------------------+           +---------------------+
                                             |                      |                      |                      |                      |
                                             ^                      |                      |                      |                      |
                                             VPN network          |                      |                      |                      |
                                             * and cost maps       |                      |                      |                      |
                                             /------------------------\  Network service provider
                                             |                      |
+------------+          +-----------+          +----+          +-----------+          +-----------+          +-----------+          +-----------+          +-----------+
|  App a     |          | ()--------|          | ()--------|          | ()--------|          | ()--------|          | ()--------|          | ()--------|
+------------+          +-----------+          +----+          +-----------+          +-----------+          +-----------+          +-----------+          +-----------+
San Francisco  \---|          |---/         Paris
                                             |                      |
                                             ^                      |                      |
                                             |                      |
                                             V                      V
                                             Customer VPN
                                             +------------+          +------------+          +------------+          +------------+
|  App b     |          |  App c     |          |  App c     |          |  App c     |          |  App c     |
+------------+          +------------+          +------------+          +------------+          +------------+          +------------+
Chicago      Ottawa
VPNs vs. Public Internet

- **Types of provider-supplied VPNs**
  - L3VPN: VPN sites all have IP subnet ranges
  - L2VPN: VPN sites form part of flat sub-IP network
  - Others (e.g., pseudo-wires): Transparent tunnels

- **Differences to public Internet**
  - Addressing - VPN sizes may not have meaningful address
  - Overlay over the MPLS/IP core, not only using IGP/EGP routing
  - No connectivity to sites not already attached to the VPN (i.e., app-level measurement not possible at all in certain cases)
  - Topology is customer-specific and must only exposed to authorized users
  - Better ALTO guidance possible due to controlled environment (typically single AS)

- **Benefits of ALTO guidance**
  - Avoid the overhead and issues of per-application measurements
  - Expose information not measurable (e.g., cost to unconnected VPN sites)
Overview of Use Cases

- **Use case 1: Application guidance in an L3VPN**
  - Example 1: ALTO guidance between VPN sites (IP addresses possible)
  - Example 2: Non-measurable VPN parameters (e.g., redundancy)
  - Example 3: VPNs with multiple uplinks

- **Use case 2: Application guidance in an L2VPN**
  - Example 4: ALTO guidance between VPN sizes (IP/MAC addresses not possible)

- **Use case 3: VPN guidance without addresses**
  - Example 5: ALTO guidance between VPN sizes (no address at all)
  - Example 6: VPN size lookup based on geographical coordinates

- **Use case 4: Extending the VPN**
  - Example 7: ALTO costs to destinations currently not reachable

- **Use case 5: Shrinking the VPN**
  - Example 8: VPN site consolidation

- **Use case 6: VPN selection**
  - Example 9: Selection among several VPN candidates
Requirements and Gap Analysis

• REQ 1: Minimum changes to ALTO ✓
• REQ 2: No exposure of network service provider internal addressing ✓
• REQ 3: Use of PID concept ✓
• REQ 4: Different VPN types, not L3VPNs only ✗
• REQ 5: IP addresses not the only form of network identification ✗
• REQ 6: IP address are not globally routable or unique ?
• REQ 7: Attributes for VPN sites, e. g., geographic coordinates ✗ (but in charter)
• REQ 8: ALTO filters for attributes, e. g., geographic coordinates ✗ (but in charter)
• REQ 9: PID selection based on geographic coordinates ✗ (but in charter)
• REQ 10: Extension/shrinking of VPN resources ✗
• REQ 11: Exposure only to authorized users of the VPN ?
Impact on ALTO

- **Draft -00:** Motivation, problem statement, and requirements
  - Obvious solutions seem to exist (mostly mentioned in charter or base spec)
  - Interest in feedback before proposing a specific syntax/semantic

- **Potential for a *generic* ALTO extension**
  - Decoupling of PIDs from addresses (mentioned in charter)
  - Attributes for PIDs, in particular geographic addresses (mentioned in charter)
  - Extended endpoint property service for lookup (obvious lookups)
  - More *VPN-specific* features to be discussed in WG

- Minor, generic, well-focused ALTO extension
- Orthogonal to other suggestions (e.g., new cost types)