

Provisioning Domains

draft-bruneau-intarea-provisioning-domains

B. Bruneau, T. Pauly, P. Pfister, D.
Schinazi, E. Vyncke



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**WHAT ARE WE TRYING TO
SOLVE?**

Back to Basics

The Internet Protocol

IPv4: 192.168.1.1

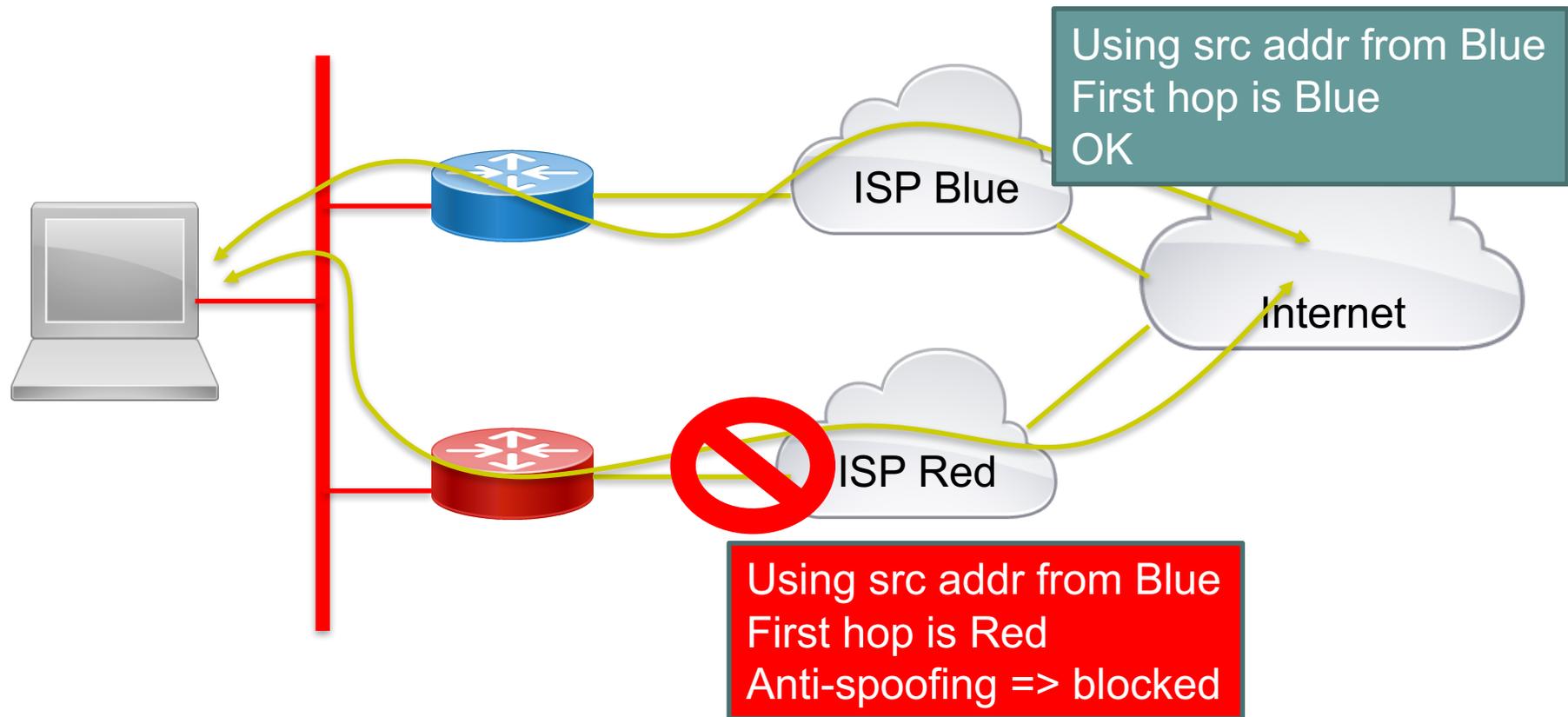
IPv6: FE80::0202:B3FF:FE1E:8329
2001:db8:abba:babe::1234
fd00::1:3060:2a08:1505:f6ca

IPv6 Nodes have Multiple Addresses



- Each IPv6 nodes can have multiple addresses
 - 1 Link-Local Address
 - Several Global Addresses
 - Through DHCPv6 which can give multiple addresses
 - Through Stateless Address Auto Configuration (SLAAC)
 1. Based on several distinct Router Advertisements from each adjacent IPv6 routers
 2. Each Router Advertisements can include multiple /64 prefixes
 3. Nodes then generate 1, 2, ... Addresses per prefixes

Use case #1: Multi-Homing

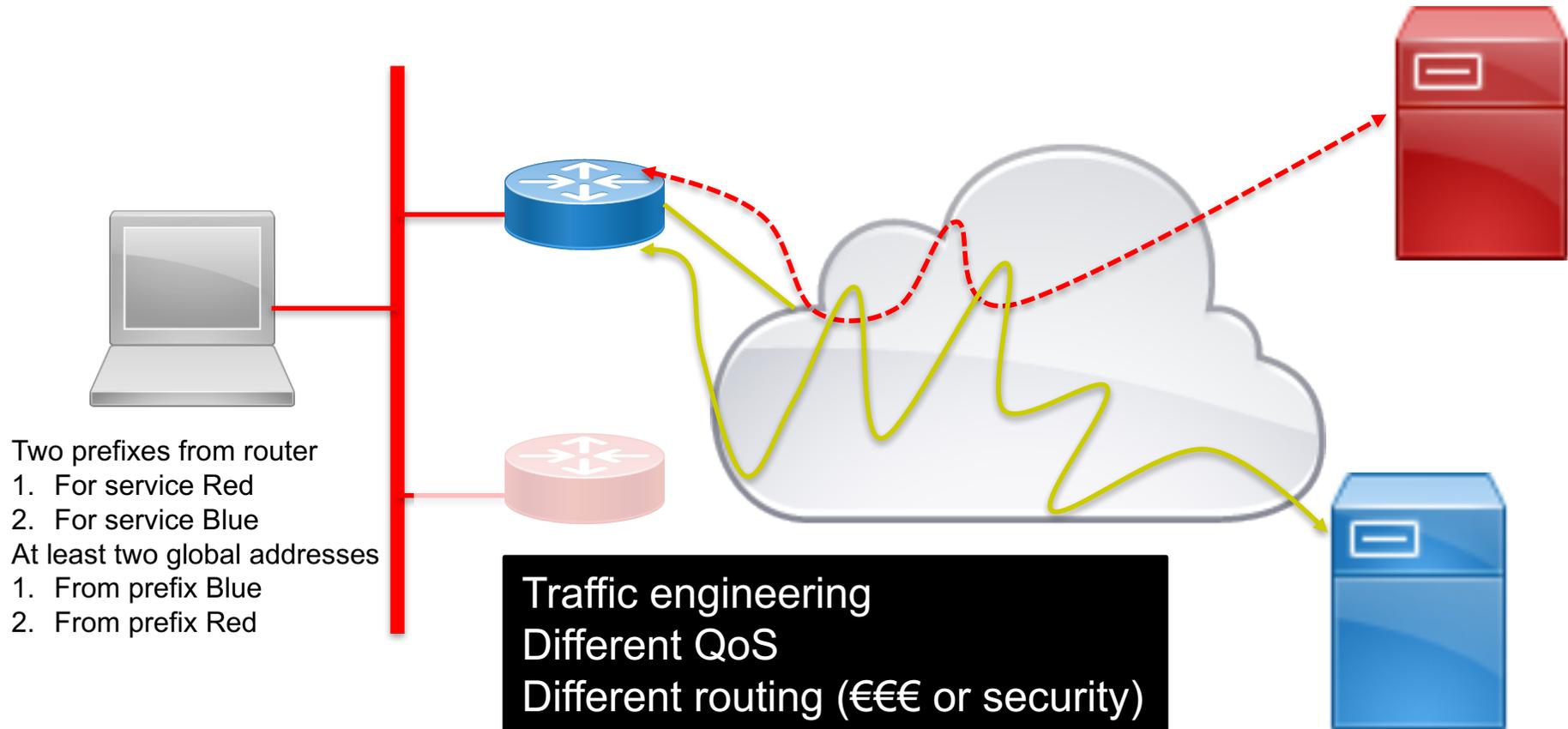


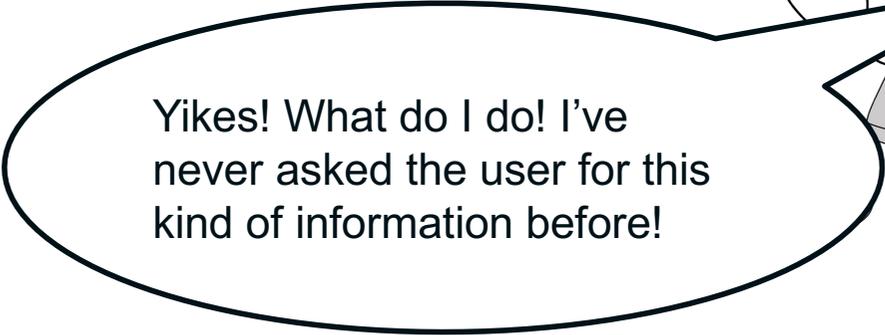
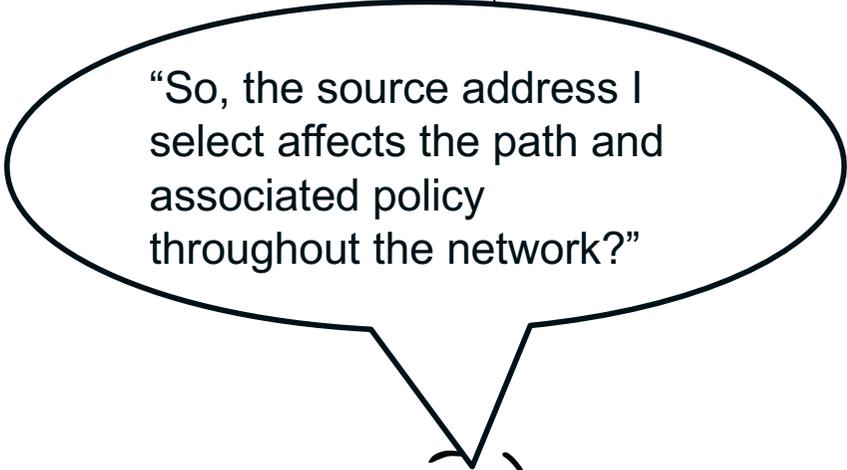
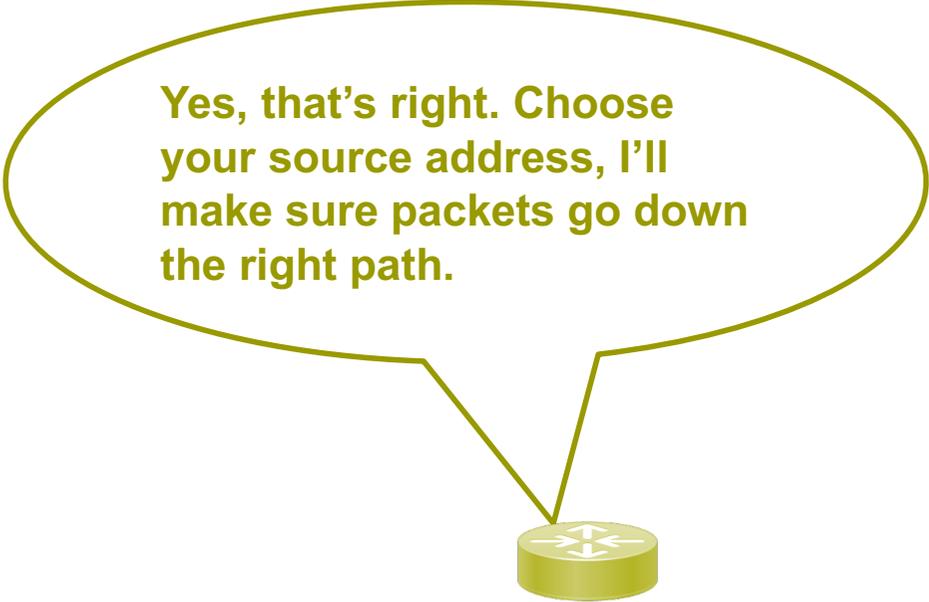
Solving the First Hop Issue



- Need to associate a prefix with first hop
- Mainly a host issue (IETF work in progress)
- More complex (provisioning domain)
 - DNS servers from different ISP can have a different view (wwwin.cisco.com does not exist in global DNS)
 - **Provisioning domain** (PvD)
 - Need support in multi-interface router, IETF work in progress (Apple, Cisco, Google)
- Could have multiple layers of routers
 - **Destination / source routing** (IETF work in progress, aka source address dependent routing SADR) easier than Policy Based Routing

Use case 2: Service Selection





Credit: Mark Townsley





PROVISIONING DOMAINS (PVD)

Provisioning Domain (PvD)



- Configuration items for a node to access a network
 - PvD ID (similar to FQDN) to tag all PvD information
 - can be used to remove PvD information when PvD is expired/removed/..
 - Human readable (localized) name
 - Prefix, next-Hop router
 - Internet access is possible
 - Captive portal is present
 - Recursive DNS server, DNS search list
 - Maximum Throughput, latency
 - Financial cost structure
 - Time validity/refresh period of the PvD
 - Security
 - Quality of Service for the first hop

Bootstrap PvD



- Bootstrap PvD information added to IPv6 Router Advertisement
 - PvD applies to all Prefix Information Options (PIO)
 - Use multiple RA if the PvD is not to be shared among PIO
 - Main information is PvD ID: a FQDN
 - Optional information as a string
 - “nl10n=Connexion à Internet;mp6=2001:db8::/32;cp=1”
 - Bootstrap PvD ID may be used to retrieve additional PvD information (next slide)



2nd Stage PvD

- A JSON file can be fetched via `https://<PvDID>/v1.json`
- All HTTP headers **MUST** be enforced
 - Accept-Language
 - Expiration
- The “masterIpv6Prefix” key is used to check whether the RA PIO is correct



What kind of information?

- DNS information including search domains
- Reachable prefixes
- Internet access or walled garden
- Captive portal is present
- IPv4 NAT ☹️ presence, time-outs
- Segment Routing Header value
- Cost structure

Link to IPv4 Information



- PvD obtained by IPv6 could be linked to IPv4
 - IPv4 prefix included in bootstrap/2nd-stage PvD ?
 - Link via the source MAC address of the RA w/ DHCPv4 message
 - Interface ID (such as 3GPP link) when not ambiguous
 - DNS search list of DHCPv4 and IPv6 PvD

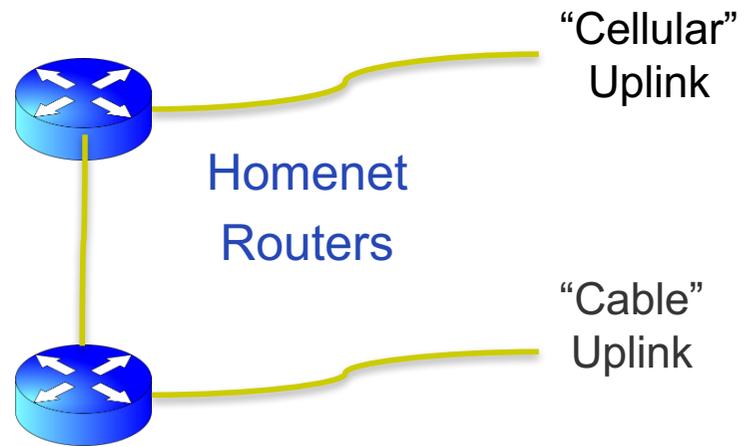
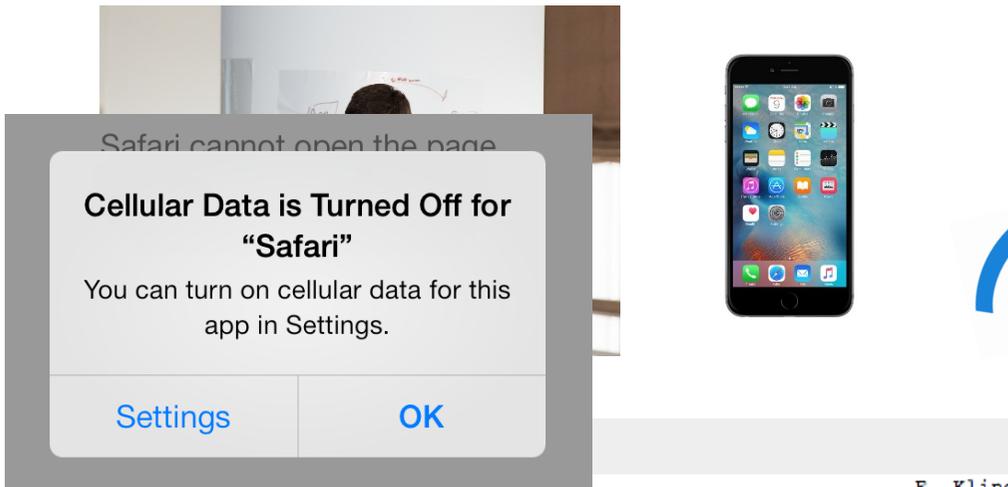


RUNNING CODE



IPv6 Multiprefix @ IETF 94 Hackathon - Test

1. One Homenet SSID
2. Two IPv6 Prefixes "Cellular" and "Cable"
3. Disabled "Cable" prefix on iPhone
4. iPhone app reports it only as "Cellular"



Internet Engineering Task Force
Internet-Draft
Intended status: Informational
Expires: May 04, 2016

E. Kline
Google Japan KK
November 01, 2015

Multiple Provisioning Domains API Requirements
draft-kline-mif-mpvd-api-reqs-00

Abstract

[RFC 7556](#) [[RFC7556](#)] provides the essential conceptual guidance an API designer would need to support use of PvDs. This document aims to capture the requirements for an API that can be used by applications

IPv6 Multiprefix Application Integration



The image shows two overlapping browser windows. The background window is 'Meine IP-Adresse | heise Netze - Mozilla Firefox'. The foreground window is 'Google - Mozilla Firefox'. In the foreground window, a search for 'Pick your PVD:' is shown with a dropdown menu listing several IPv6 prefixes: 'cable (fd14:445c:1c22:26:20c:29ff:fefa:9f1c)', 'No PVD selected', 'cellular (2001:470:ff87:26:20c:29ff:fefa:9f1c)', 'wifi (2001:470:ff61:26:20c:29ff:fefa:9f1c)', 'Crappy v4 (10.0.17.202)', and 'cable (fd14:445c:1c22:26:20c:29ff:fefa:9f1c)'. The background window shows the 'Meine IP-Adresse' page with the IP address '2001:470:721F:100::c0:ffee:babe' and a 'Tools' menu open, highlighting 'SpaceNet' and 'HE.NET'.

Credit: Gert Doering, SpaceNet AG, Munich, Germany

neat

A New, Evolutive API and Transport-Layer Architecture for the Internet: <https://www.neat-project.org/>

European H-2020 project

10 partners (Cisco, Mozilla, EMC, Celerway...)

Provisioning Domain (information about a prefix) via DNS [draft-stenberg-mif-mpvd-dns-00](https://www.ietf.org/archive/id/draft-stenberg-mif-mpvd-dns-00) (old)

Integration to NEAT code: <https://github.com/NEAT-project/neat/pull/80>

Asking the user to choose with relevant criteria and simple UI



LTE (ORANGE)				
	2 mn	\$ 0.5 GB \$0		3%
VPN OVER LTE (ORANGE)				
	6 mn	\$ 0.5 GB \$0		4%
Wi-Fi (OSLO HOSTEL Wi-Fi)				
	11 mn			1%



Next Steps

- Presented at V6OPS and Captive Portal WG
- But, authors think that INTAREA is more suitable
 - Our ask: make this I-D a WG document