64 Bits Are Not Enough for Anybody

or
What's Your IPv6 Address Plan?

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ENOG16, Tbilisi, June 2019

The Good News

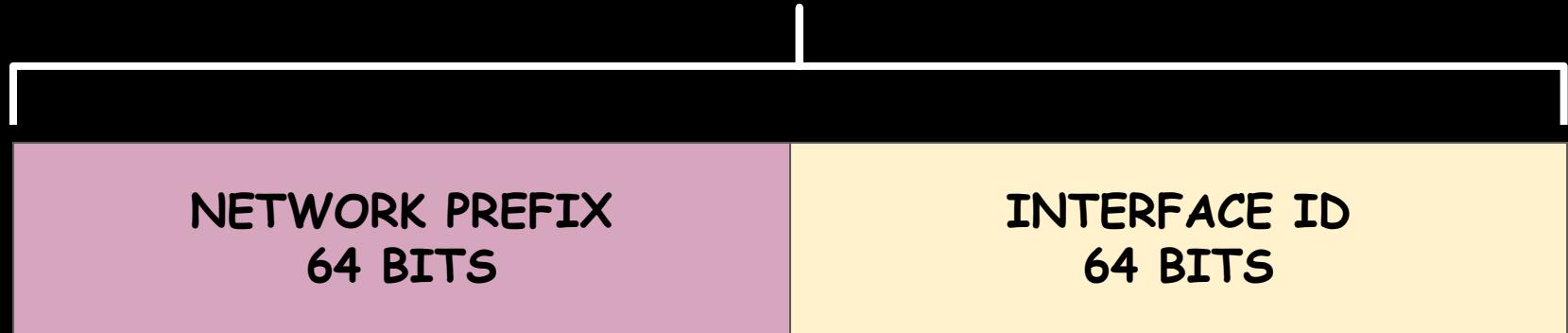Use of IPv6 for Russian Federation (RU)

The Bad News

Users' CPEs
receive
a single /64
via
DHCP-PD

IPv6 101

IPv6 Address Structure

NETWORK PREFIX 64 BITS	INTERFACE ID 64 BITS

Every subnet needs /64
Multiple /64s are needed for multiple subnets

[Docs] [txt|pdf] [draft-ietf-v6op...] [Tracker] [Diff1] [Diff2]

BEST CURRENT PRACTICE

Internet Engineering Task Force (IETF)   T. Narten
Request for Comments: 6177   IBM
BCP: 157   G. Huston
Obsoletes: 3177   APNIC
Category: Best Current Practice   L. Roberts
ISSN: 2070-1721   Stanford University
                                                        March 2011

                IPv6 Address Assignment to End Sites

Abstract

   RFC 3177 argued that in IPv6, end sites should be assigned /48 blocks
   in most cases. The Regional Internet Registries (RIRs) adopted that
   recommendation in 2002, but began reconsidering the policy in 2005.
   This document obsoletes the RFC 3177 recommendations on the
   assignment of IPv6 address space to end sites. The exact choice of
   how much address space to assign end sites is an issue for the
   operational community. The IETF's role in this case is limited to
   providing guidance on IPv6 architectural and operational
   considerations. This document reviews the architectural and
   operational considerations of end site assignments as well as the
   motivations behind the original recommendations in RFC 3177.
   Moreover, this document clarifies that a one-size-fits-all
   recommendation of /48 is not nuanced enough for the broad range of
   end sites and is no longer recommended as a single default.


RFC 6177   IPv6 Address Assignment to End Sites   March 2011

   This document does, however, reaffirm an important assumption behind
   RFC 3177:

      A key principle for address management is that end sites always be
      able to obtain a reasonable amount of address space for their
      actual and planned usage, and over time ranges specified in years
      rather than just months. In practice, that means at least one
      /64, and in most cases significantly more. One particular
      situation that must be avoided is having an end site feel
      compelled to use IPv6-to-IPv6 Network Address Translation or other
      burdensome address conservation techniques because it could not
      get sufficient address space.

   This document does not make a formal recommendation on what the exact
   assignment size should be. The exact choice of how much address
   space to assign end sites is an issue for the operational community.
   The IETF's role in this case is limited to providing guidance on IPv6
   architectural and operational considerations. This document provides
   input into those discussions. The focus of this document is to
   examine the architectural issues and some of the operational
   considerations relating to the size of the end site assignment.

Home Networks Today

ISP NETWORK

CPE

Home WiFi

Guest WiFi

Home LAN

Another LAN
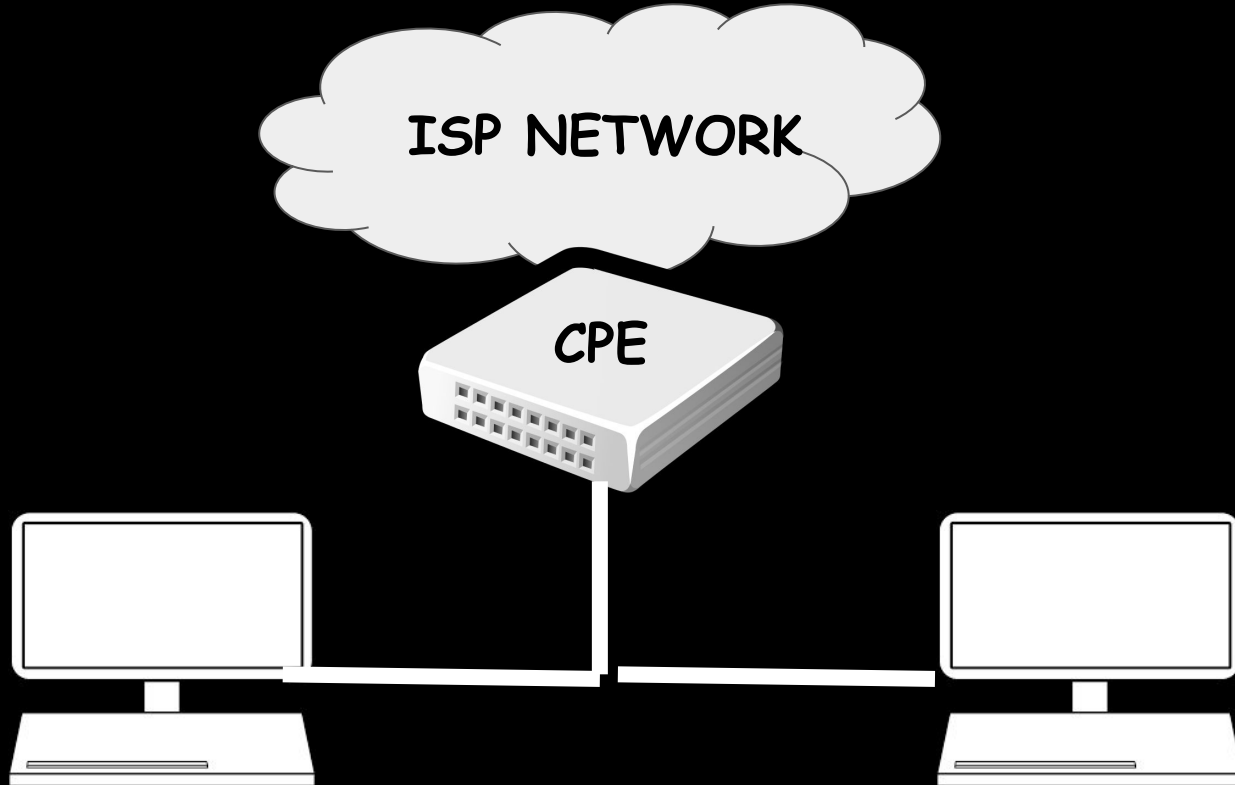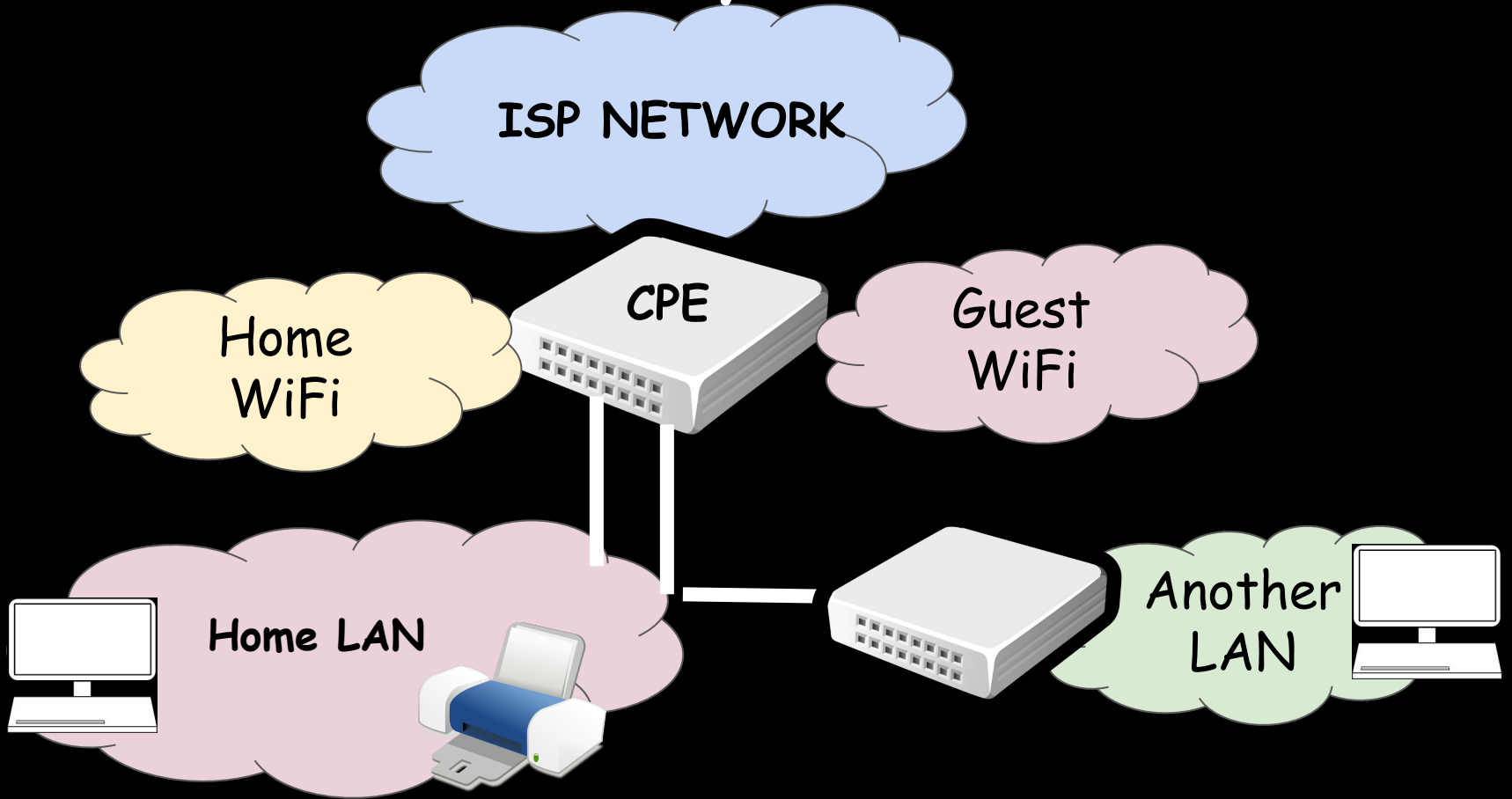
Offers multiple subnets by default

TP-Link TL-WR902AC AC750 750Mbps WiFi Wireless Mini Travel Portable USB Router

★★★★★ 6 product ratings

Condition: **Brand New**

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Posts to: Australia   See exclusions

Delivery: Estimated between **Tue. 4 Jun.** and **Wed. 12 Jun.** ⊘

What Good is IPv6

If You Have to Deploy NAT?

Let's Do Some Math...

To give /56 to everyone....

- Russia Population: ~144M
- 2^28 = 268M
- 56 - 28 = 28 => **/28 would be enough**

To give /56 to every household...

- ~53M households in Russia
- 2^26 = 67M
- 56 - 26 = /30 => **/30 would be enough.**

Dear ISPs!
Please assign multiple /64s!

Love, users.