ipv6-prefix-size-analysis

September 27, 2016

1 IPv6 Prefix Size Analysis

1.1 Introduction

This notebook helps us analyze the prefix size distribution in the IPv6 routing table. The expected input file format is a list of prefixes, one per line, in this way:

```
2001:278::/32
2001:288::/32
2001:290::/32
2001:290:4000::/36
2001:298::/32
2001:2A8::/32
2001:2B8::/32
2001:2B8:2::/48
2001:2B8:7::/48
2001:2B8:11::/48
```

Thie file should be named 'ipv6table.txt'.

```
In [1]: %%bash
        echo 'Add logic for automatically retrieve the routing table file'
```

```
Add logic for automatically retrieve the routing table file
```

1.2 Retrieved files

```
In [4]: %%bash
        ls -l *txt
```

```
-rw-r--r-- 1 vagrant vagrant 374426 Sep 27 20:52 ipv6table.txt
```

1.3 Analisys Script and Results

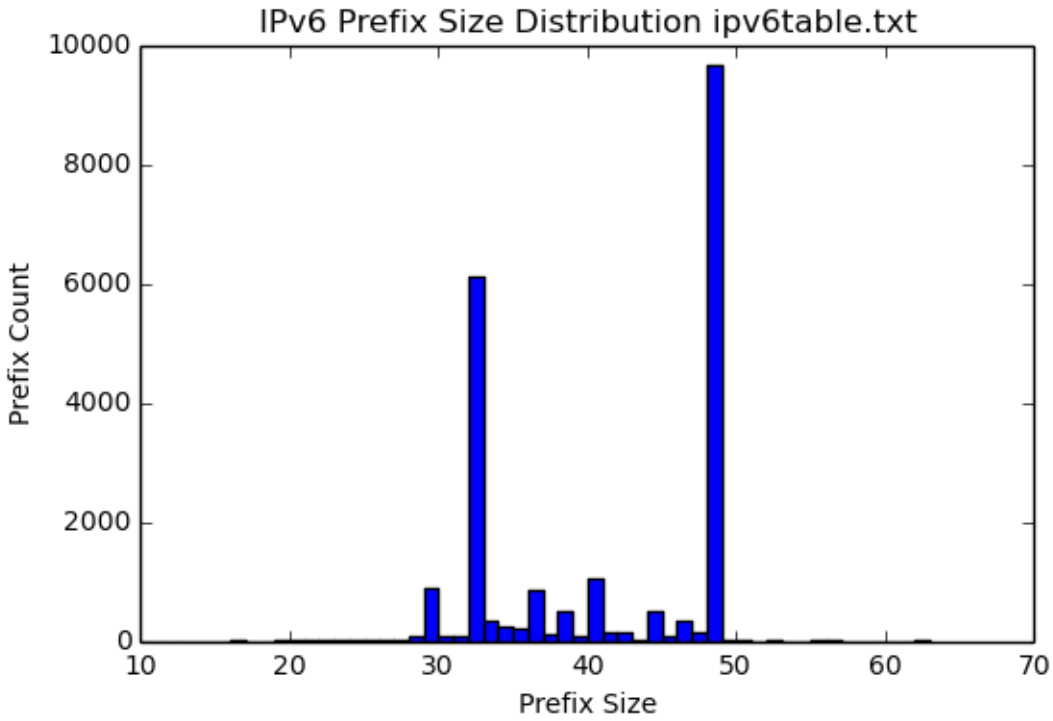
In [30]:
```
import csv
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
#
files = ['ipv6table.txt']
ranges = [(9,64), (9,31), (33,47), (49,64)]

## begin
def load_pfx(f):
    f = open(f, "rb")
    rd = csv.reader(f, delimiter="/")
    i = 0
    pfx = []
    for line in rd:
        # print line[0], line[1]
        try:
            line = [x for x in line if x != '']
            pfx.append(int(line[1]))
        except:
            print "linea problematica [%s]" % (line)
            break
        # pfx_roa.append(5)
        i = i + 1
        if i>25000:
            break
        #
    f.close()
    # print "*** lines %s" % (i)
    return np.array(pfx)
## end get_pfx_roa+stats

for R in ranges:
    pr = load_pfx(rir)
    print "================================="
    print "Processing RIR data: %s" % (rir)
    print "\tlines: %s" %(len(pr))
    print "\tavg  : %s" % (np.average(pr))
    print " "
    hist = plt.hist(pr, bins=range(R[0],R[1]))
    plt.title("IPv6 Prefix Size Distribution %s" % (rir))
    plt.xlabel("Prefix Size")
    plt.ylabel("Prefix Count")
    plt.show()
    sum=0
    for x in range(0, len(hist[0])):
```

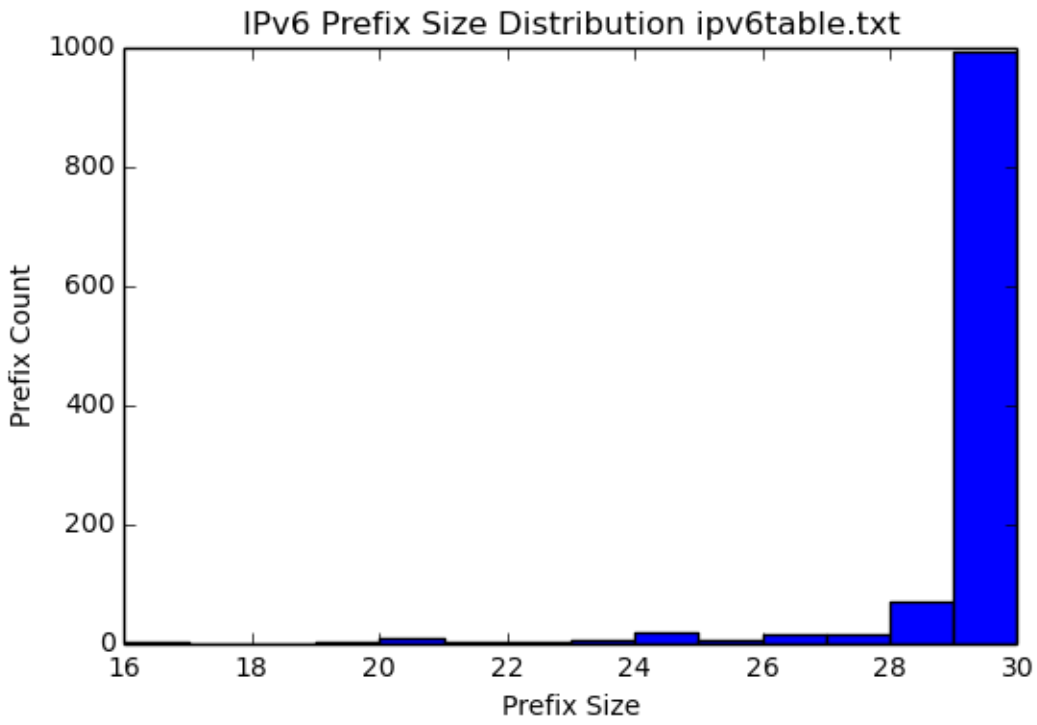
```
                print(hist[1][x], hist[0][x])
                sum = sum + hist[0][x]
            print "Total prefixes in range %s: %s (%s pct)" % (R,sum,sum*100.0/ler
            print "================================="
```

```
=================================
Processing RIR data: ipv6table.txt
        lines: 21769
        avg  : 40.53507281
```



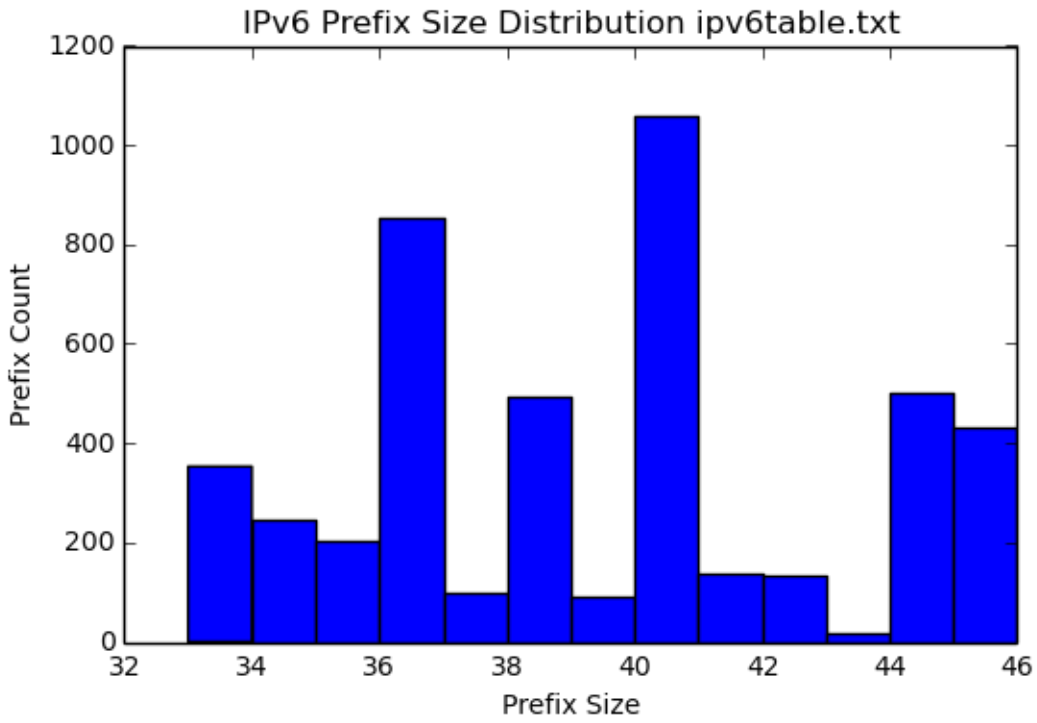

```
(9, 0.0)
(10, 0.0)
(11, 0.0)
(12, 0.0)
(13, 0.0)
(14, 0.0)
(15, 0.0)
(16, 1.0)
(17, 0.0)
(18, 0.0)
(19, 2.0)
(20, 9.0)
```

```
(21, 2.0)
(22, 3.0)
(23, 4.0)
(24, 17.0)
(25, 5.0)
(26, 14.0)
(27, 15.0)
(28, 69.0)
(29, 901.0)
(30, 91.0)
(31, 73.0)
(32, 6114.0)
(33, 353.0)
(34, 246.0)
(35, 202.0)
(36, 855.0)
(37, 97.0)
(38, 492.0)
(39, 92.0)
(40, 1057.0)
(41, 137.0)
(42, 132.0)
(43, 18.0)
(44, 501.0)
(45, 89.0)
(46, 344.0)
(47, 135.0)
(48, 9672.0)
(49, 2.0)
(50, 1.0)
(51, 0.0)
(52, 2.0)
(53, 0.0)
(54, 0.0)
(55, 1.0)
(56, 5.0)
(57, 0.0)
(58, 0.0)
(59, 0.0)
(60, 0.0)
(61, 0.0)
(62, 1.0)
Total prefixes in range (9, 64): 21754.0 (99.9310946759 pct)
==================================
==================================
Processing RIR data: ipv6table.txt
        lines: 21769
        avg  : 40.53507281
```



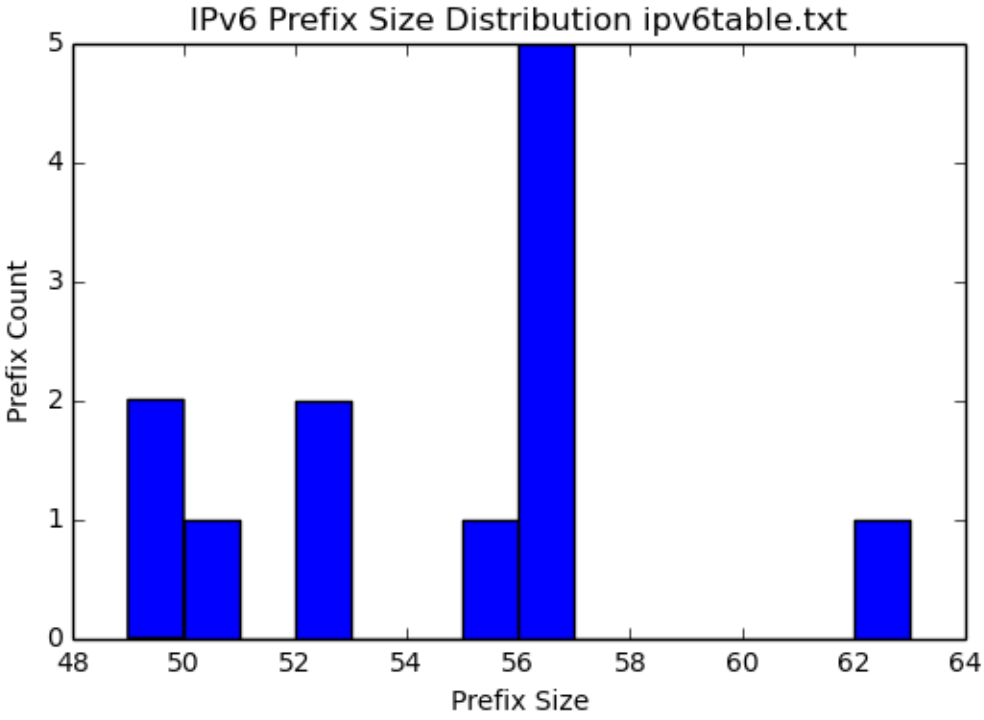

```
(9, 0.0)
(10, 0.0)
(11, 0.0)
(12, 0.0)
(13, 0.0)
(14, 0.0)
(15, 0.0)
(16, 1.0)
(17, 0.0)
(18, 0.0)
(19, 2.0)
(20, 9.0)
(21, 2.0)
(22, 3.0)
(23, 4.0)
(24, 17.0)
(25, 5.0)
(26, 14.0)
(27, 15.0)
(28, 69.0)
(29, 992.0)
```

```
Total prefixes in range (9, 31): 1133.0 (5.20464881253 pct)
==================================
==================================
Processing RIR data: ipv6table.txt
        lines: 21769
        avg  : 40.53507281
```




```
(33, 353.0)
(34, 246.0)
(35, 202.0)
(36, 855.0)
(37, 97.0)
(38, 492.0)
(39, 92.0)
(40, 1057.0)
(41, 137.0)
(42, 132.0)
(43, 18.0)
(44, 501.0)
(45, 433.0)
Total prefixes in range (33, 47): 4615.0 (21.1998713767 pct)
==================================
```

```
==================================
Processing RIR data: ipv6table.txt
        lines: 21769
        avg  : 40.53507281
```




```
(49, 2.0)
(50, 1.0)
(51, 0.0)
(52, 2.0)
(53, 0.0)
(54, 0.0)
(55, 1.0)
(56, 5.0)
(57, 0.0)
(58, 0.0)
(59, 0.0)
(60, 0.0)
(61, 0.0)
(62, 1.0)
Total prefixes in range (49, 64): 12.0 (0.0551242592678 pct)
==================================
```