

## PA3-part3

October 16, 2015

**Q1:**How many IP prefixes does the Internet have? How many unique ASes? (Note: Unless otherwise mentioned, a prefix refers to any prefix that appears in the routing table, even if it is contained in another prefix, overlaps with another prefix etc. That is, count all prefixes even if they do not cover mutually exclusive IP address ranges.)

**Ans:** Number of unique prefixes are 525483

Number of unique ases are 48237

**Q2:**IITB owns four /24s in the range 103.21.124.0 - 103.21.127.255. List all the routing table entries (prefixes and corresponding AS paths) that correspond to IITB in the routing table. Ans:

|                 |   |
|-----------------|---|
| 103.21.124.0/24 | 11537 7660 7660 7660 24287 24490 55824 132423             |
| 103.21.124.0/24 | 8492 9002 15412 18101 9885 55824 132423                   |
| 103.21.124.0/24 | 3561 1299 15412 18101 9885 55824 132423                   |
| 103.21.124.0/24 | 1239 1299 15412 18101 9885 55824 132423                   |
| 103.21.124.0/24 | 293 3257 15412 18101 9885 55824 132423                    |
| 103.21.124.0/24 | 701 1299 15412 18101 9885 55824 132423                    |
| 103.21.124.0/24 | 2914 15412 18101 9885 55824 132423                        |
| 103.21.124.0/24 | 1668 3257 15412 18101 9885 55824 132423                   |
| 103.21.124.0/24 | 37100 6453 15412 18101 9885 55824 132423                  |
| 103.21.124.0/24 | 13030 15412 18101 9885 55824 132423                       |
| 103.21.124.0/24 | 1299 15412 18101 9885 55824 132423                        |
| 103.21.124.0/24 | 3257 15412 18101 9885 55824 132423                        |
| 103.21.124.0/24 | 3130 2914 15412 18101 9885 55824 132423                   |
| 103.21.124.0/24 | 7660 24287 24490 55824 132423                             |
| 103.21.124.0/24 | 40191 3257 15412 18101 9885 55824 132423                  |
| 103.21.124.0/24 | 2152 2153 11537 7660 7660 7660 24287 24490 55824 132423   |
| 103.21.124.0/24 | 5413 15412 18101 9885 55824 132423                        |
| 103.21.124.0/24 | 3741 15412 18101 9885 55824 132423                        |
| 103.21.124.0/24 | 3356 15412 15412 15412 15412 18101 9885 55824 132423      |
| 103.21.124.0/24 | 852 1299 15412 18101 9885 55824 132423                    |
| 103.21.124.0/24 | 1221 4637 15412 18101 9885 55824 132423                   |
| 103.21.124.0/24 | 6762 15412 18101 9885 55824 132423                        |
| 103.21.124.0/24 | 11686 19782 11537 7660 7660 7660 24287 24490 55824 132423 |
| 103.21.124.0/24 | 3549 3356 15412 15412 15412 15412 18101 9885 55824 132423 |
| 103.21.124.0/24 | 22652 3257 15412 18101 9885 55824 132423                  |
| 103.21.124.0/24 | 6939 15412 18101 9885 55824 132423                        |
| 103.21.124.0/24 | 6539 577 2914 15412 18101 9885 55824 132423               |
| 103.21.124.0/24 | 286 15412 18101 9885 55824 132423                         |
| 103.21.124.0/24 | 3549 3356 15412 15412 15412 15412 18101 9885 55824 132423 |
| 103.21.124.0/24 | 7018 2914 15412 18101 9885 55824 132423                   |
| 103.21.124.0/24 | 3130 2914 15412 18101 9885 55824 132423                   |
| 103.21.124.0/24 | 3303 15412 18101 9885 55824 132423                        |
| 103.21.124.0/24 | 2497 15412 18101 9885 55824 132423                        |

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| 103.21.125.0/24 | 11537 7660 7660 7660 24287 24490 55824 132423             |
| 103.21.125.0/24 | 8492 9002 15412 18101 9885 55824 132423                   |
| 103.21.125.0/24 | 3561 1299 15412 18101 9885 55824 132423                   |
| 103.21.125.0/24 | 1239 1299 15412 18101 9885 55824 132423                   |
| 103.21.125.0/24 | 293 3257 15412 18101 9885 55824 132423                    |
| 103.21.125.0/24 | 701 1299 15412 18101 9885 55824 132423                    |
| 103.21.125.0/24 | 2914 15412 18101 9885 55824 132423                        |
| 103.21.125.0/24 | 1668 3257 15412 18101 9885 55824 132423                   |
| 103.21.125.0/24 | 37100 6453 15412 18101 9885 55824 132423                  |
| 103.21.125.0/24 | 13030 15412 18101 9885 55824 132423                       |
| 103.21.125.0/24 | 1299 15412 18101 9885 55824 132423                        |
| 103.21.125.0/24 | 3257 15412 18101 9885 55824 132423                        |
| 103.21.125.0/24 | 3130 2914 15412 18101 9885 55824 132423                   |
| 103.21.125.0/24 | 7660 24287 24490 55824 132423                             |
| 103.21.125.0/24 | 40191 3257 15412 18101 9885 55824 132423                  |
| 103.21.125.0/24 | 2152 2153 11537 7660 7660 7660 24287 24490 55824 132423   |
| 103.21.125.0/24 | 5413 15412 18101 9885 55824 132423                        |
| 103.21.125.0/24 | 3741 15412 18101 9885 55824 132423                        |
| 103.21.125.0/24 | 3356 15412 15412 15412 15412 18101 9885 55824 132423      |
| 103.21.125.0/24 | 852 1299 15412 18101 9885 55824 132423                    |
| 103.21.125.0/24 | 1221 4637 15412 18101 9885 55824 132423                   |
| 103.21.125.0/24 | 6762 15412 18101 9885 55824 132423                        |
| 103.21.125.0/24 | 11686 19782 11537 7660 7660 7660 24287 24490 55824 132423 |
| 103.21.125.0/24 | 3549 3356 15412 15412 15412 15412 18101 9885 55824 132423 |
| 103.21.125.0/24 | 22652 3257 15412 18101 9885 55824 132423                  |
| 103.21.125.0/24 | 6939 15412 18101 9885 55824 132423                        |
| 103.21.125.0/24 | 6539 577 2914 15412 18101 9885 55824 132423               |
| 103.21.125.0/24 | 286 15412 18101 9885 55824 132423                         |
| 103.21.125.0/24 | 3549 3356 15412 15412 15412 15412 18101 9885 55824 132423 |
| 103.21.125.0/24 | 7018 2914 15412 18101 9885 55824 132423                   |
| 103.21.125.0/24 | 3130 2914 15412 18101 9885 55824 132423                   |
| 103.21.125.0/24 | 3303 15412 18101 9885 55824 132423                        |
| 103.21.125.0/24 | 2497 15412 18101 9885 55824 132423                        |

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| 103.21.126.0/24 | 8492 3209 3209 55410 132423 132423 132423 132423 132423 132423             |
| 103.21.126.0/24 | 3561 209 3491 55410 132423 132423 132423 132423 132423 132423              |
| 103.21.126.0/24 | 1239 3356 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 1668 3356 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 2914 15412 18101 9885 9498 55410 132423 132423 132423 132423 132423 132423 |
| 103.21.126.0/24 | 293 3491 55410 132423 132423 132423 132423 132423 132423                   |
| 103.21.126.0/24 | 701 3356 55410 132423 132423 132423 132423 132423 132423                   |
| 103.21.126.0/24 | 37100 3356 55410 132423 132423 132423 132423 132423 132423                 |
| 103.21.126.0/24 | 3303 1273 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 6539 577 3491 55410 132423 132423 132423 132423 132423 132423              |
| 103.21.126.0/24 | 3741 3209 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 11686 3356 55410 132423 132423 132423 132423 132423 132423                 |
| 103.21.126.0/24 | 2152 11164 3491 55410 132423 132423 132423 132423 132423 132423            |
| 103.21.126.0/24 | 3130 1239 3356 55410 132423 132423 132423 132423 132423 132423             |
| 103.21.126.0/24 | 6762 3356 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 1221 4637 3356 55410 132423 132423 132423 132423 132423 132423             |
| 103.21.126.0/24 | 22652 3356 55410 132423 132423 132423 132423 132423 132423                 |
| 103.21.126.0/24 | 7660 4635 1273 55410 132423 132423 132423 132423 132423 132423             |
| 103.21.126.0/24 | 5413 3209 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 3356 55410 132423 132423 132423 132423 132423 132423 132423                |
| 103.21.126.0/24 | 2497 3491 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 3257 15412 18101 9885 9498 55410 132423 132423 132423 132423 132423 132423 |
| 103.21.126.0/24 | 852 3491 55410 132423 132423 132423 132423 132423 132423                   |
| 103.21.126.0/24 | 3549 3491 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 3130 1239 3356 55410 132423 132423 132423 132423 132423 132423             |
| 103.21.126.0/24 | 40191 174 3491 55410 132423 132423 132423 132423 132423 132423             |
| 103.21.126.0/24 | 7018 3491 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 286 3356 55410 132423 132423 132423 132423 132423 132423                   |
| 103.21.126.0/24 | 6939 3491 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 13030 1273 55410 132423 132423 132423 132423 132423 132423                 |
| 103.21.126.0/24 | 1299 1273 55410 132423 132423 132423 132423 132423 132423                  |
| 103.21.126.0/24 | 3549 3491 55410 132423 132423 132423 132423 132423 132423                  |

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| 103.21.127.0/24 | 8492 9002 6453 4755 132423  |
| 103.21.127.0/24 | 1239 6453 4755 132423       |
| 103.21.127.0/24 | 3561 6453 4755 132423       |
| 103.21.127.0/24 | 293 6453 4755 132423        |
| 103.21.127.0/24 | 701 6453 4755 132423        |
| 103.21.127.0/24 | 1668 6453 4755 132423       |
| 103.21.127.0/24 | 2914 6453 6453 4755 132423  |
| 103.21.127.0/24 | 37100 6453 4755 132423      |
| 103.21.127.0/24 | 2152 3356 6453 4755 132423  |
| 103.21.127.0/24 | 852 6453 4755 132423        |
| 103.21.127.0/24 | 3303 6453 4755 132423       |
| 103.21.127.0/24 | 22652 6453 4755 132423      |
| 103.21.127.0/24 | 6539 577 6453 4755 132423   |
| 103.21.127.0/24 | 5413 1299 6453 4755 132423  |
| 103.21.127.0/24 | 3741 3356 6453 4755 132423  |
| 103.21.127.0/24 | 1221 4637 6453 4755 132423  |
| 103.21.127.0/24 | 2497 6453 4755 132423       |
| 103.21.127.0/24 | 7660 4635 6453 4755 132423  |
| 103.21.127.0/24 | 6762 6453 4755 132423       |
| 103.21.127.0/24 | 11686 3356 6453 4755 132423 |
| 103.21.127.0/24 | 3549 6453 4755 132423       |
| 103.21.127.0/24 | 3130 1239 6453 4755 132423  |
| 103.21.127.0/24 | 3356 6453 4755 132423       |
| 103.21.127.0/24 | 3257 6453 4755 132423       |
| 103.21.127.0/24 | 3130 1239 6453 4755 132423  |
| 103.21.127.0/24 | 13030 3549 6453 4755 132423 |
| 103.21.127.0/24 | 286 6453 4755 132423        |
| 103.21.127.0/24 | 7018 6453 4755 132423       |
| 103.21.127.0/24 | 3549 6453 4755 132423       |
| 103.21.127.0/24 | 1299 6453 4755 132423       |
| 103.21.127.0/24 | 6939 1299 6453 4755 132423  |
| 103.21.127.0/24 | 40191 3257 6453 4755 132423 |

**Q3:**From the AS path information above, figure out how many ISPs IITB buys network service from. Write down their AS numbers, and names (from looking up whois).

**Ans:**

| <b>IITB's ISP</b> | <b>NAME</b>   |
|-------------------|---|
| 55410             | VODAFONE-NET-AS-AP C48 Okhla Industrial Estate, New Delhi-110020,IN |
| 55824             | NKN-CORE-NW NKN Core Network,IN                                     |
| 4755              | TATACOMM-AS TATA Communications formerly VSNL is Leading ISP,IN     |

**Q4** Find out the top 10 ASes that have the highest degree (i.e., connected to the most number of other ASes, as seen from the AS paths) in the routing table. Look up their names from whois. Can you guess what these ASes are (e.g., ISPs, end-user companies etc.) from their names?