



The page contains presentations and tutorials Philip has developed and/or presented over the last decade or so. They are all sorted in descending of year. The most recent presentations/tutorials should be considered to be the most up to date versions of the relevant content. Please feel free to reuse these for your own training activities - and do let Philip know about any suggestions for improvements or enhancements to the most recent materials. All feedback is most welcome.

| Year | Event        | Slideset                                                                |
|------|--------------|-------------------------------------------------------------------------|
| 2016 | APRICOT 2016 | <a href="#">BGP Techniques for Network Operators</a>                    |
|      |              | <a href="#">BGP Multihoming Techniques</a>                              |
|      |              | <a href="#">Troubleshooting BGP</a>                                     |
|      |              | <a href="#">Virtualisation for Network Testing &amp; Staff Training</a> |
|      | SANOG 27     | <a href="#">BGP Techniques for Network Operators</a>                    |
|      |              | <a href="#">BGP Multihoming Techniques</a>                              |
|      |              | <a href="#">Virtualisation for Testing &amp; Staff Training</a>         |
|      |              | <a href="#">Internet IPv4 Routing Table Analysis Update</a>             |
| 2015 | APRICOT 2015 | <a href="#">IPv6 Transition Strategies</a>                              |
|      |              | <a href="#">IPv6 Deployment Planning</a>                                |
|      | MENOG 15     | <a href="#">Internet IPv4 Routing Table Analysis Update</a>             |
|      | PacNOG 17    | <a href="#">A Practical IPv6 Introduction</a>                           |
|      | SAFNOG 2     | <a href="#">Migrating from OSPF to IS-IS</a>                            |
|      |              | <a href="#">Internet IPv4 Routing Table Analysis Update</a>             |
|      | SANOG 25     | <a href="#">BGP Techniques for Internet Service Providers</a>           |
|      |              | <a href="#">BGP Multihoming Techniques</a>                              |
|      |              | <a href="#">IPv6 Transition Strategies</a>                              |
|      |              | <a href="#">IPv6 Deployment Planning</a>                                |
|      |              | <a href="#">Internet IPv4 Routing Table Analysis Update</a>             |

| Year | Event        | Slideset                                                        |
|------|--------------|-----------------------------------------------------------------|
| 2014 | AfNOG 2014   | <a href="#">Routing Table Update</a>                            |
|      | APNIC 38     | <a href="#">IPv6 Transition Strategies</a>                      |
|      |              | <a href="#">IPv6 Deployment Planning</a>                        |
|      | BDNOG 1      | <a href="#">BGP Techniques for Internet Service Providers</a>   |
|      |              | <a href="#">BGP Multihoming Techniques</a>                      |
|      |              | <a href="#">Internet Development: Experiences &amp; Lessons</a> |
|      |              | <a href="#">Internet IPv4 Routing Table Analysis Update</a>     |
|      | BTNOG 1      | <a href="#">Internet in Bhutan</a>                              |
|      |              | <a href="#">DrukREN Technical Design</a>                        |
|      |              | <a href="#">Internet IPv4 Routing Table Analysis Update</a>     |
|      | MENOG 14     | <a href="#">IPv6 Transition Strategies</a>                      |
|      |              | <a href="#">IPv6 Deployment Planning</a>                        |
|      | PacNOG 16    | <a href="#">Peering and IXPs</a>                                |
|      | SAFNOG 1     | <a href="#">BGP Best Current Practices</a>                      |
| 2013 | SANOG 23     | <a href="#">BGP Techniques for Internet Service Providers</a>   |
|      |              | <a href="#">IPv6 Essentials</a>                                 |
|      |              | <a href="#">IPv6 Transition Planning</a>                        |
|      |              | <a href="#">IPv6 Deployment Planning</a>                        |
|      | AfNOG 2013   | <a href="#">NOG Update</a>                                      |
|      | APNIC 36     | <a href="#">BGP Techniques for Internet Service Providers</a>   |
|      |              | <a href="#">BGP Multihoming Techniques</a>                      |
|      |              | <a href="#">IPv6 Transition Strategies</a>                      |
|      |              | <a href="#">IPv6 Deployment Planning</a>                        |
|      | APRICOT 2013 | <a href="#">IPv6 Introduction</a>                               |
|      |              | <a href="#">IPv6 Transition Technologies</a>                    |
|      |              | <a href="#">IPv6 Deployment Planning</a>                        |
|      |              | <a href="#">BGP Multihoming Techniques</a>                      |
|      | CaribNOG 5   | <a href="#">Internet Routing Table Analysis Update</a>          |
|      | MENOG 13     | <a href="#">Peering, Transit and IXP Design</a>                 |
|      |              | <a href="#">Internet Exchange Point Design</a>                  |
|      |              | <a href="#">BGP Multihoming Techniques</a>                      |
|      | MyNOG 3      | <a href="#">IPv6 Transition Strategies</a>                      |
|      |              | <a href="#">Migrating from OSPF to IS-IS</a>                    |
|      | SANOG 22     | <a href="#">Internet Routing Table Analysis Update</a>          |

| Year | Event                            | Slideset                                                      |
|------|----------------------------------|---------------------------------------------------------------|
| 2012 | APRICOT 2012                     | BGP Multihoming Techniques<br>Migrating from OSPF to IS-IS    |
|      | AfNOG 2012                       | BGP Multihoming Techniques                                    |
|      | APNIC 34                         | IPv6 Address Planning<br>ISP & IXP Design                     |
|      | MENOG 10                         | BGP Multihoming Techniques<br>Migrating from OSPF to IS-IS    |
|      | MENOG 11                         | IPv6 Address Planning                                         |
|      |                                  | ISP & IXP Design                                              |
|      |                                  | Peering, Transit & IXPs                                       |
|      | MyNOG 2                          | BGP Multihoming Techniques                                    |
|      |                                  | IPv6 Address Planning                                         |
|      |                                  | Internet Routing Table Analysis Update                        |
| 2011 | NZNOG 2012                       | Migrating from OSPF to IS-IS                                  |
|      | PacNOG 12                        | Peering, Transit and IXP Design                               |
|      | SANOG 20                         | Internet Routing Table Analysis Update                        |
|      | APRICOT 2011                     | BGP Techniques for Internet Service Providers                 |
|      |                                  | IPv6 Addressing & Routing Protocols                           |
|      | AfNOG 2011                       | Routing Table Update                                          |
|      |                                  | BGP Techniques for Internet Service Providers                 |
|      |                                  | BGP Multihoming                                               |
|      |                                  | Troubleshooting BGP                                           |
|      | PacNOG 9                         | Towards and IPv6-only network                                 |
| 2010 | PacNOG 10                        | IPv6 Deployment Planning                                      |
|      | SANOG 17                         | Internet Routing Table Analysis Update                        |
|      | SANOG 18                         | Internet Routing Table Analysis Update                        |
|      | AfNOG 2010                       | NOG Updates                                                   |
|      | APAN 29                          | The Next Three Years                                          |
|      | APRICOT 2010                     | BGP Techniques for Internet Service Providers                 |
|      | NANOG 50                         | BGP Techniques for Internet Service Providers                 |
|      | NZNOG 2010                       | The Next Three Years: IPv6, IPv4 runout and 4-byte ASNs       |
|      | PacNOG 7                         | Introduction to Cloud Computing                               |
|      | PacNOG 8                         | IPv6 and 4-byte ASN update                                    |
|      | RIPE NCC Regional Meeting Moscow | Network Operations Groups around the World                    |
|      | SANOG 15                         | Internet Routing Table Analysis Update                        |
| 2010 | SANOG 16                         | Network Operations Groups around the World                    |
|      |                                  | Internet Routing Table Analysis Update<br>Troubleshooting BGP |

| Year | Event                               | Slideset                                                                      |
|------|-------------------------------------|-------------------------------------------------------------------------------|
| 2009 | AfNOG 2009                          | <a href="#">Routing Table Update</a>                                          |
|      |                                     | <a href="#">NOG Updates</a>                                                   |
|      | APRICOT 2009                        | <a href="#">BGP Techniques for Internet Service Providers</a>                 |
|      |                                     | <a href="#">BGP Multihoming Techniques</a>                                    |
|      | Australian Computer Society ACS2009 | <a href="#">The Next Three Years</a>                                          |
|      | MENOG 5                             | <a href="#">IPv6 Deployment Study</a>                                         |
|      |                                     | <a href="#">32-bit ASNs</a>                                                   |
|      |                                     | <a href="#">The Next Three Years: IPv4 runout and the motivation for IPv6</a> |
|      |                                     | <a href="#">Internet Routing Table Analysis Update</a>                        |
|      |                                     | <a href="#">IPv6 Technical &amp; Service Considerations</a>                   |
|      | RIPE 58                             | <a href="#">2008-06: Use of Final /8 (v2)</a>                                 |
|      |                                     | <a href="#">2008-07: Ensuring efficient use of IPv4 resources (v2)</a>        |
|      | SANOG 13                            | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a>                |
|      | SANOG 14                            | <a href="#">32-bit ASNs</a>                                                   |
|      |                                     | <a href="#">BGP Multihoming Techniques</a>                                    |
|      |                                     | <a href="#">Troubleshooting BGP</a>                                           |
|      |                                     | <a href="#">Network Operations Groups</a>                                     |

| Year | Event                  | Slideset                                                                              |
|------|------------------------|---------------------------------------------------------------------------------------|
| 2008 | AfNOG 2008             | <a href="#">NOG Updates</a>                                                           |
|      | AfriNIC 9              | <a href="#">How Cisco is preparing for IPv6</a>                                       |
|      | APRICOT 2008           | <a href="#">Troubleshooting BGP</a>                                                   |
|      |                        | <a href="#">BGP Aggregation &amp; Deaggregation Report</a>                            |
|      | Cisco AU ISP Roadshow  | <a href="#">Internet Status</a>                                                       |
|      | JANOG 22               | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a>                        |
|      |                        | <a href="#">Network Operations Groups</a>                                             |
|      | MENOG 3                | <a href="#">BGP Techniques for Internet Service Providers</a>                         |
|      |                        | <a href="#">IPv6 Addressing &amp; Routing Protocols</a>                               |
|      | MENOG 4                | <a href="#">IS-IS Tutorial</a>                                                        |
|      |                        | <a href="#">Network Operations Groups Update</a>                                      |
|      | NANOG 42               | <a href="#">Introduction to IPv6</a>                                                  |
|      |                        | <a href="#">Troubleshooting BGP</a>                                                   |
|      | NANOG 44               | <a href="#">BGP Techniques for Internet Service Providers</a>                         |
|      |                        | <a href="#">IPv6 Addressing &amp; Routing Protocols</a>                               |
|      | Netnod IPv6 Conference | <a href="#">IPv6 @ NANOG, APRICOT and other places</a>                                |
|      |                        | <a href="#">IPv6 Address &amp; Routing Protocols</a>                                  |
|      | NZNOG 2008             | <a href="#">32-bit ASNs</a>                                                           |
|      |                        | <a href="#">BGP Techniques for Internet Service Providers</a>                         |
|      |                        | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a>                        |
|      | OECD ITC 2008          | <a href="#">The State of the Internet Routing Infrastructure</a>                      |
|      | PacNOG 4               | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a>                        |
|      |                        | <a href="#">Network Operations Groups</a>                                             |
|      | PhNOG 3                | <a href="#">IPv6 @ NANOG, APRICOT and other places</a>                                |
|      | RIPE 56                | <a href="#">Network Operations Groups</a>                                             |
|      | RIPE 57                | <a href="#">Proposal 2008-06: Use of Final /8</a>                                     |
|      |                        | <a href="#">Proposal 2008-07: Ensuring efficient use of historical IPv4 resources</a> |
|      | SANOG 11               | <a href="#">32-bit ASNs</a>                                                           |
|      |                        | <a href="#">BGP Techniques for Internet Service Providers</a>                         |
|      |                        | <a href="#">Improving the Internet Infrastructure</a>                                 |
|      |                        | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a>                        |
|      | SANOG 12               | <a href="#">BGP Multihoming Techniques</a>                                            |
|      |                        | <a href="#">Troubleshooting BGP</a>                                                   |
|      |                        | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a>                        |

| Year | Event        | Slideset                                                       |
|------|--------------|----------------------------------------------------------------|
| 2007 | AfNOG 2007   | <a href="#">Internet Routing &amp; Deaggregation Report</a>    |
|      |              | <a href="#">32-bit ASNs</a>                                    |
|      |              | <a href="#">Advanced Routing Workshop</a>                      |
|      |              | <a href="#">BGP Multihoming Techniques</a>                     |
|      | AfrINIC 7    | <a href="#">32-bit ASNs</a>                                    |
|      |              | <a href="#">IPv6 at Cisco</a>                                  |
|      | APRICOT 2007 | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a> |
|      |              | <a href="#">BGP Techniques for Internet Service Providers</a>  |
|      | ARIN 20      | <a href="#">IPv6 Addressing &amp; Routing Protocols</a>        |
|      | MENOG 1      | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a> |
|      |              | <a href="#">BGP Multihoming Techniques</a>                     |
|      | MENOG 2      | <a href="#">32-bit ASNs</a>                                    |
|      |              | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a> |
|      |              | <a href="#">IPv6 Routing Protocols: What has changed?</a>      |
|      |              | <a href="#">IPv6 Addressing &amp; Routing Protocols</a>        |
|      |              | <a href="#">BGP Techniques for Internet Service Providers</a>  |
|      | NANOG 39     | <a href="#">BGP Deaggregation Report</a>                       |
|      |              | <a href="#">Troubleshooting BGP</a>                            |
|      | NANOG 40     | <a href="#">BGP Techniques for Internet Service Providers</a>  |
|      | NANOG 41     | <a href="#">BGP Multihoming Techniques</a>                     |
|      | PacNOG 3     | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a> |
|      | PhNOG 1      | <a href="#">BGP Multihoming Techniques</a>                     |
|      | PhNOG 2      | <a href="#">Improving the Internet Infrastructure</a>          |
|      |              | <a href="#">BGP Route Aggregation Best Practices</a>           |
|      | SANOG 9      | <a href="#">BGP Techniques for Internet Service Providers</a>  |
|      |              | <a href="#">BGP Multihoming Techniques</a>                     |
|      |              | <a href="#">BGP Route Aggregation Best Practices</a>           |
|      |              | <a href="#">Internet Routing Table Analysis Update</a>         |
|      | SANOG 10     | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a> |
|      |              | <a href="#">BGP Multihoming Techniques</a>                     |
|      | UKNOF 8      | <a href="#">BGP Best Practices</a>                             |
|      |              | <a href="#">BGP Aggregation &amp; The Deaggregation Report</a> |

| Year | Event                             | Slideset                                      |
|------|-----------------------------------|-----------------------------------------------|
| 2006 | AfNOG 2006                        | BGP Multihoming Techniques                    |
|      | AfrINIC 5                         | Aggregation Recommendations                   |
|      |                                   | IPv6: A Global Perspective                    |
|      |                                   | BGP Techniques for Internet Service Providers |
|      | APNIC 22                          | BGP Tutorial                                  |
|      |                                   | BGP Multihoming Techniques                    |
|      |                                   | Troubleshooting BGP                           |
|      | APRICOT 2006                      | Deploying BGP                                 |
|      |                                   | BGP Multihoming Techniques                    |
|      |                                   | Troubleshooting BGP                           |
|      | NANOG 36                          | Troubleshooting BGP                           |
|      | NANOG 37                          | BGP Techniques for Internet Service Providers |
|      | NANOG 38                          | BGP Multihoming Techniques                    |
|      | NZNOG 2006                        | Deploying BGP                                 |
|      |                                   | BGP Multihoming Techniques                    |
|      |                                   | Troubleshooting BGP                           |
|      | QUESTnet 2006                     | BGP Techniques for Providers                  |
|      | RIPE 52                           | BGP Flap Damping: Deprecating RIPE-229        |
|      | RIPE 53                           | Route Aggregation Recommendations             |
| 2005 | RIPE NCC Regional Meeting Bahrain | BGP Best Practices                            |
|      | SANOG 7                           | NGP Multihoming & Internet Exchange Points    |
|      |                                   | Internet Routing Table Analysis Update        |
|      | SANOG 8                           | Scaling IGP in ISP Networks                   |
|      |                                   | BGP Multihoming Techniques                    |
|      |                                   | Internet Routing Table Analysis Update        |
|      | APNIC 20                          | BGP Flap Damping: Where to now?               |
|      | APRICOT 2005                      | Deploying BGP                                 |
|      |                                   | Troubleshooting BGP                           |
|      | NANOG 33                          | Troubleshooting BGP                           |
|      | NANOG 34                          | BGP Techniques for Internet Service Providers |
|      | NANOG 35                          | BGP Multihoming Techniques                    |
|      | RIPE 50                           | Aggregation (?)                               |
|      |                                   | BGP Flap Damping                              |
|      | RIPE 51                           | BGP Flap Damping: Where to now?               |
|      | SANOG 5                           | Internet Routing Table Analysis Update        |
|      |                                   | IPv6 Tutorial                                 |
|      | SANOG 6                           | Aggregation (?)                               |

| Year                                   | Event                                  | Slideset                                      |
|----------------------------------------|----------------------------------------|-----------------------------------------------|
| 2004                                   | APRICOT 2004                           | BGP Tutorial                                  |
|                                        |                                        | BGP Multihoming                               |
|                                        | NANOG 31                               | BGP Techniques for Internet Service Providers |
|                                        | NANOG 32                               | BGP Multihoming Techniques                    |
|                                        | NZNOG 2004                             | Troubleshooting BGP                           |
|                                        | RIPE NCC Regional Meeting Moscow       | ripenncc-moscow-routing.pdf                   |
|                                        | SANOG 3                                | BGP enhancements for IPv6                     |
|                                        |                                        | IPv6 Multicast                                |
|                                        |                                        | BGP Multihoming Techniques                    |
| Internet Routing Table Analysis Update |                                        |                                               |
| SANOG 4                                | Internet Routing Table Analysis Update |                                               |
| 2003                                   | AfNOG 2003                             | Troubleshooting BGP                           |
|                                        | APNIC 16                               | BGP Multihoming                               |
|                                        |                                        | Catching Worms at APNIC 16                    |
|                                        | APRICOT 2003                           | Routing Table Update                          |
|                                        |                                        | BGP Tutorial                                  |
|                                        |                                        | BGP Deployment Technqies                      |
|                                        |                                        | BGP Multihoming                               |
|                                        |                                        | BGP Troubleshooting                           |
|                                        | NANOG 27                               | BGP for Internet Service Providers            |
|                                        | NANOG 28                               | BGP Multihoming Techniques                    |
|                                        | NANOG 29                               | BGP Troubleshooting                           |
|                                        | RIPE 44                                | Internet Routing Table Analysis Update        |
|                                        | RIPE 45                                | Day in the Life of a BGP Update in Cisco IOS  |
|                                        | RIPE NCC Regional Meeting Dubai        | Introduction to Routing                       |
|                                        | SANOG 1                                | BGP for Internet Service Providers            |
|                                        |                                        | BGP Multihoming Techniques                    |
|                                        | SANOG 2                                | ISP Essentials                                |
| BGP Multihoming Techniques             |                                        |                                               |
| 2002                                   | AfNOG 2002                             | BGP for Internet Service Providers            |
|                                        | APNIC 14                               | BGP Multihoming                               |
|                                        | APRICOT 2002                           | Routing Table Update                          |
|                                        | IEPG @ IETF54                          | Routing Table Update                          |
|                                        | KIOW 2002                              | BGP for Internet Service Providers            |
|                                        | NANOG 25                               | IXes in the AP Region                         |
|                                        |                                        | BGP for Internet Service Providers            |
|                                        | NANOG 26                               | Troubleshooting BGP                           |
|                                        | RIPE 41                                | Internet Routing Table Analysis Update        |
|                                        | RIPE 42                                | Internet Routing Table Analysis Update        |

| Year | Event        | Slideset                                                                         |
|------|--------------|----------------------------------------------------------------------------------|
| 2001 | APNIC 12     | <a href="#">Internet Routing Analysis</a>                                        |
|      | APRICOT 2001 | <a href="#">Promoting Routability</a>                                            |
|      |              | <a href="#">BGP Multihoming</a>                                                  |
|      | ARIN 7       | <a href="#">Internet Routing Table Analysis Update</a>                           |
|      | AUUG 2001    | <a href="#">Router Security</a>                                                  |
|      | NANOG 22     | <a href="#">BGP Tutorial</a>                                                     |
|      | NANOG 23     | <a href="#">BGP Multihoming Techniques</a>                                       |
|      | RIPE 38      | <a href="#">Internet Routing Table Analysis Update</a>                           |
|      | RIPE 39      | <a href="#">Revisions to RIPE 210: Coordinated Route Flap Damping Parameters</a> |
| 2000 | RIPE 40      | <a href="#">BGP for Internet Service Providers</a>                               |
|      | IEPG@IETF49  | <a href="#">Internet Routing Table Analysis Update</a>                           |
|      | ISPCON 2K    | <a href="#">Promoting Routability</a>                                            |
|      |              | <a href="#">BGP Multihoming</a>                                                  |
|      | RIPE 37      | <a href="#">Internet Routing Table Analysis Update</a>                           |
|      |              | <a href="#">BGP Flap Damping</a>                                                 |
| 1999 | APRICOT 99   | <a href="#">Promoting Routability</a>                                            |
| 1998 | APRICOT 98   | <a href="#">Promoting Routability</a>                                            |

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