



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

Shaping the Future of Internet

Supporting RIPE NCC's vision with training
and certification

LINX118 - JAD EL CHAM

RIPE NCC Learning & Development

What is the RIPE NCC?



Internet Assigned Numbers Authority



RIR = Regional Internet Registry

- Not-for-profit organisation
- Funded by membership fees
- Policies developed by regional communities
- Neutral, impartial, open, and transparent



Discussion forum open to everybody interested

The RIPE community

The RIPE Network Coordination Centre

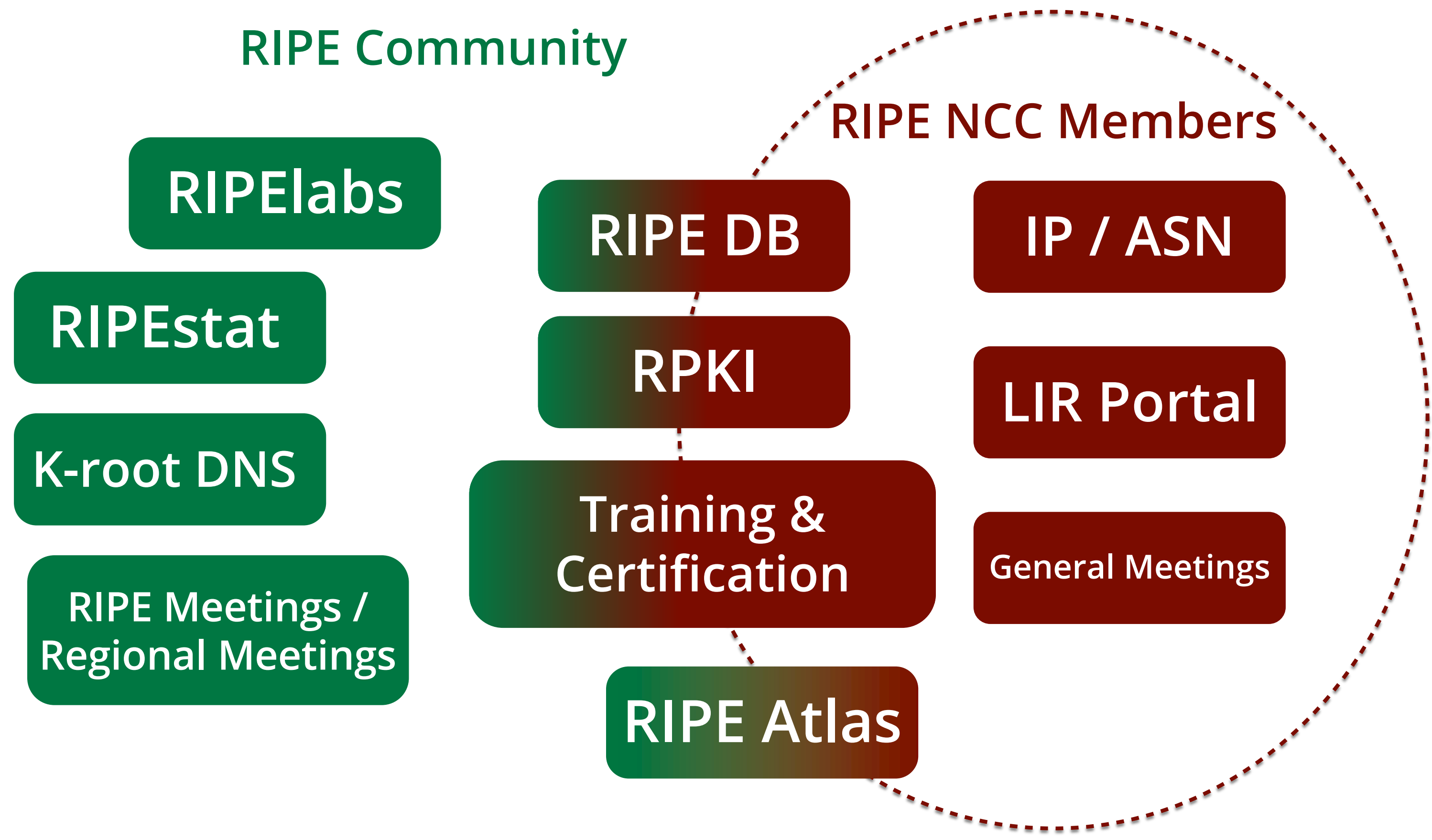


RIPE NCC

RIPE NETWORK COORDINATION CENTRE

- ~170 employees
- Offices in Amsterdam and Dubai
- Membership based

RIPE NCC offers...



Learning & Development



Learning Experiences

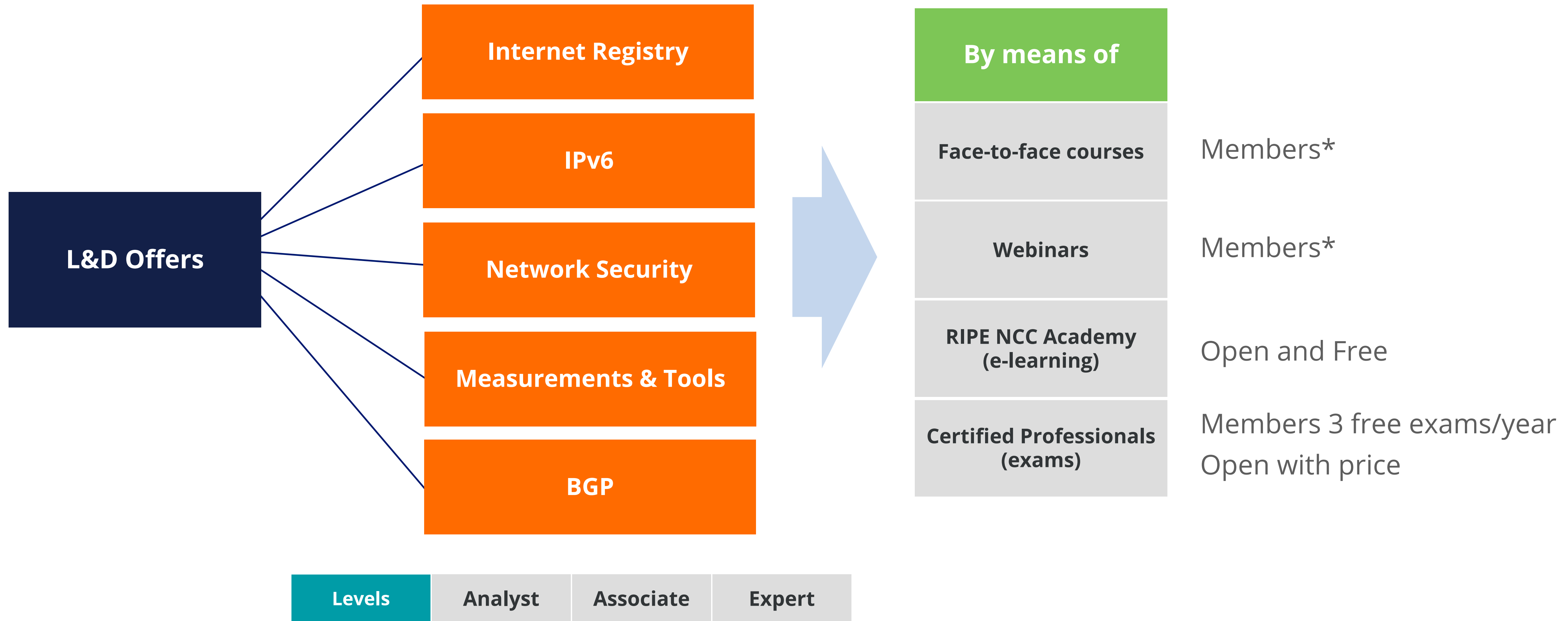
- Instruct in **best practices**
- Provide **practical knowledge**
- Enabling to contribute to a more secure, stable, resilient and innovative internet
- Helping with **career development**

- Content tailored to **learner's needs**
- **Relevant** and **up-to-date** content
- Involve a **variety of SMEs**
- Sound **pedagogical methodologies and techniques**
- **Engaging and accessible** learning experiences

Quality Assurance

Trusted and Neutral Source of Information

- Information **not depending on economic or political interests**
- Focusing on **BCPs** and **standards**
- Using **open source** tools and materials



RIPE NCC Learning



Upcoming Courses and Webinars

(GMT+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna

 1 MAR LONDON Free <i>Sold out</i>	 2 MAR -3 LONDON Free <i>Sold out</i>	 7 MAR LIVE ONLINE Free
 8 MAR LUXEMBOURG Free <i>Sold out</i>	 9 MAR -10 LUXEMBOURG Free <i>Sold out</i>	 13 MAR ISTANBUL Free <i>Sold out</i>
 14 MAR LUXEMBOURG Free <i>Sold out</i>	 14 MAR LONDON Free	 16 MAR LONDON Free



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Academy

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RIPE NCC Academy Demo



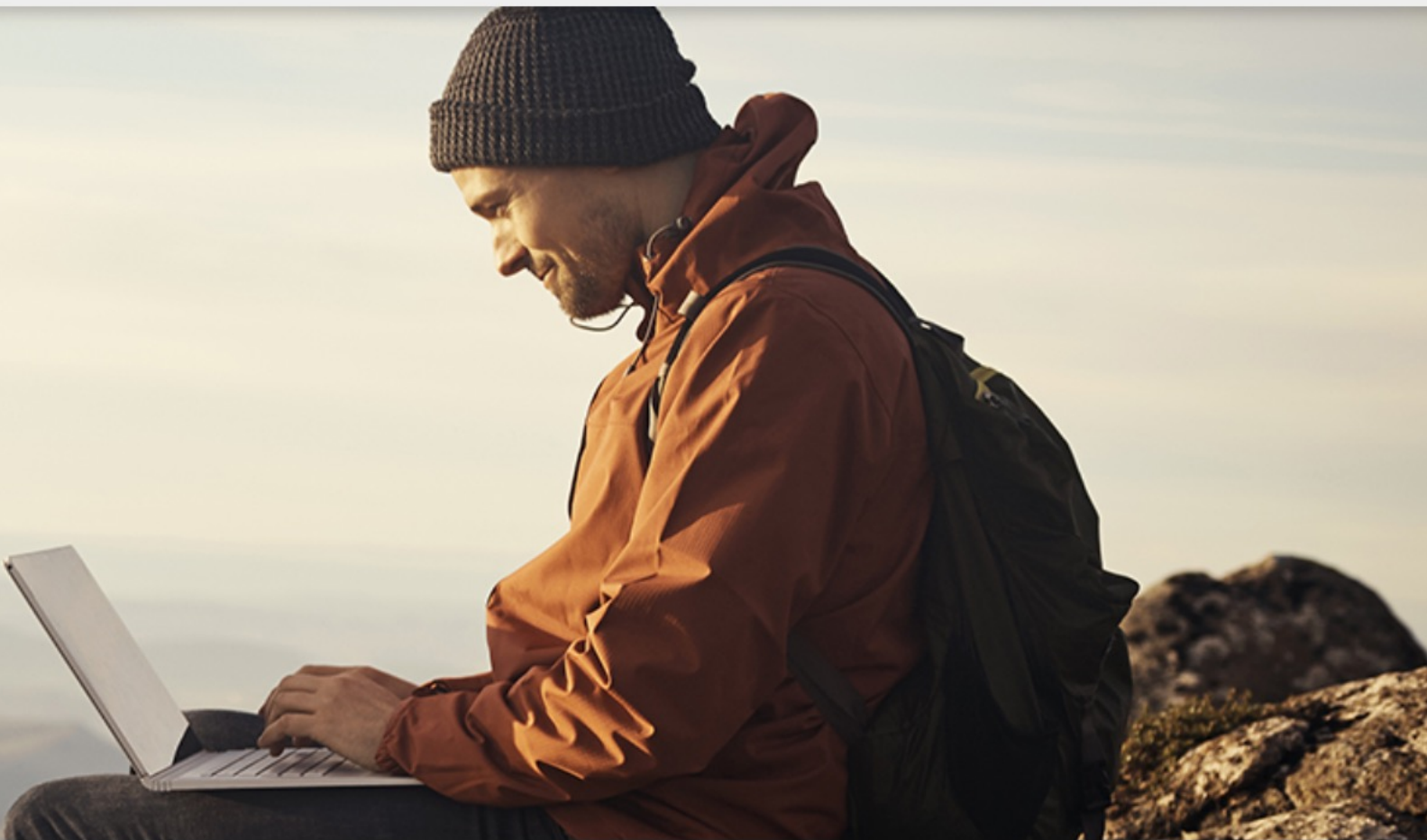
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Browse courses

E-Learning courses that go deep into one topic and will get you prepared for an exam.



IPv6 Fundamentals

UPDATED!

Get started with IPv6. You will learn how IPv6 addresses work, how to subnet, best-practices and IPv6-related RFCs among other topics.


Gets you ready for the IPv6 Fundamentals - Analyst exam 



IPv6 Security


Keep your IPv6 network secure. Learn to design a high-level strategy to protect your IPv6 infrastructure against common threats.

Gets you ready for the IPv6 Security Expert exam 



RIPE Database

Learn how the RIPE Database works. Practise querying, creating and updating objects. Understand database best-practices and more.

Gets you ready for the RIPE Database Associate exam 

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RIPE NCC Academy You are currently using guest access (Log in)

Home
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IPv6 Security

Welcome to the **IPv6 Security** e-learning course!

Please log in.

Enrol

In this course, you will learn to:

- Justify the need for implementing IPv6 security solution;
- Plan how to protect your IPv6 network against new attack vectors and most common threats;
- Design filtering rules for IPv6 packets;
- Choose security options for IPv6 routing protocols;
- Choose the correct type of tool to assess IPv6 security threats and mitigation techniques;
- Make use of up-to-date information about IPv6 network vulnerabilities and security measures;
- Design a high-level IPv6 security strategy.

Earn the IPv6 Security Expert badge!

The content of this course aligns with the **IPv6 Security Expert exam**. After finishing this course you will be prepared for the exam.
Learn more about **RIPE NCC Certified Professionals**

The course will take about **18 hours** to complete.

The course consists of **17 modules**.

You can complete **7 lab activities**.

The course is in **English** and you can take it independently, or in combination with the other RIPE NCC Academy courses and Webinars.

RIPE NCC Academy Demo



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2.3 - IPsec

Module 2.3 - IPsec

100% COMPLETE

- Overview
- IPSEC SECURITY PROTOCOLS
 - Authentication Header
 - Encapsulating Security Payload
 - Practice: IPsec Modes & Security Protocols
 - Summary

Section 1 of 5

Overview

IPsec Overview

Let's start with a general overview of how IPsec is used to protect communications between two nodes. An IPsec implementation operates in a host as a security gateway (SG). In the animation below you will see how it works on Node 1 when it wants to communicate with Node 2.

SPD Security Policy Database indicates what to do with packets

SA Security Association: info needed for IPsec with 1 host, 1 direction

IKE Internet Key Exchange allows automatic creation of SAs

Animation: IPsec

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5.2 - Running a Secure IPv6 Network

Module 5.2 - Running a Secure IPv6 Network

100% COMPLETE

- Introduction
- Up-to-Date Information
- Activity: Tools and Tips
- Summary

Let's explore an example of how you would check for vulnerabilities in your IPv6 network. This example is related to datacenters based on FreeBSD servers. It will help you understand the investigation process that starts with the identification of vulnerabilities and ends with finding possible solutions.

Demo: checking vulnerabilities related to IPv6
FreeBSD example

SANDBOX INC.

1/19

START

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Lab Activity 4 - Verifying if a security solution is working: RA-Guard

Section 1 of 5

Introduction

Lab introduction

One way to verify if the implementation of an IPv6 security solution in your network is working, is to reproduce a possible attack in a controlled environment. Creating tailor-made packets can help with this, because you will be able to fine-tune the attack and cover all possibilities.

Within NDP, the RA message provides a lot of control over the network for the administrators, but it also allows several attack possibilities for a malicious host connected to a link. The RA message has many different flags, parameters and options that can be used. Therefore, creating tailor-made RAs is something that can be very useful.

Home

Dashboard

Contact Trainer

Course Overview

- Unit 1 - Introduction
- Unit 2 - Basic IPv6 Protocol Security
- Unit 3 - Associated IPv6 Protocol Security**
- Unit 4 - Internet-wide IPv6 Protocol Security
- Unit 5 - High Level IPv6 Protocol Strategy

Guidelines

Give Us Feedback

Lab Activity 4 - Verifying if a Security Solution is Working: RA-Guard

100% COMPLETE

- Introduction ✓
- Step 1: Verify a Linux host network configuration ✓
- Step 2: Send RA with bogus address configuration prefix ✓
- Step 3: Check the effect of the RA message ✓
- Wrapping up & Lessons learned ✓

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- Dashboard
Access to the servers' consoles
- Network diagram
How are the machines connected

- Admin console
Control the VM itself
- Legal
Copyright, Privacy, Terms and Cookies

Host A

[reconnect](#) [pop out](#)

```
root@hostA:~# ip add sh
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group de
fault qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
4: eth0@if5: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state
UP group default qlen 1000
    link/ether 00:16:3e:ee:00:0a brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 192.0.2.140/24 brd 192.0.2.255 scope global dynamic eth0
        valid_lft 3119sec preferred_lft 3119sec
    inet6 2001:db8:f:1:216:3eff:feee:a/64 scope global dynamic mngtmpaddr
        valid_lft 3545sec preferred_lft 3545sec
    inet6 fe80::216:3eff:feee:a/64 scope link
        valid_lft forever preferred_lft forever
root@hostA:~#
```

[hostA] 0: lxc* "ubuntu-focal" 09:22 31-Mar-22

Host C

[reconnect](#) [pop out](#)

```
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=5 ttl=64 time=0.136 ms
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=6 ttl=64 time=0.149 ms
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=7 ttl=64 time=0.135 ms
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=8 ttl=64 time=0.055 ms
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=9 ttl=64 time=0.051 ms
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=10 ttl=64 time=0.120 ms
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=11 ttl=64 time=0.130 ms
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=12 ttl=64 time=0.210 ms
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=13 ttl=64 time=0.052 ms
64 bytes from 2001:db8:f:1:216:3eff:feee:a: icmp_seq=14 ttl=64 time=0.054 ms
^C
--- 2001:db8:f:1:216:3eff:feee:a ping statistics ---
14 packets transmitted, 14 received, 0% packet loss, time 1344ms
```

Host B

[reconnect](#) [pop out](#)

No.	Time	Source	Destination	Protocol	Length	Info
1	0.0000	2001:db8:f:ff02::1:ff	2001:db8:f:ff02::1	ICMPv6	86	Neighbor Solicitation fo
2	15.734	fe80::216:3eff:feee:c	ff02::1	ICMPv6	142	Router Advertisement fro
3	17.172	2001:db8:f:ff02::1:ff	2001:db8:f:ff02::1	ICMPv6	86	Neighbor Solicitation fo
4	17.172	2001:db8:f:2001:db8:f	2001:db8:f:2001:db8:f	ICMPv6	86	Neighbor Advertisement 2
5	17.172	2001:db8:f:2001:db8:f	2001:db8:f:2001:db8:f	ICMPv6	118	Echo (ping) request id=0
6	17.172	2001:db8:f:2001:db8:f	2001:db8:f:2001:db8:f	ICMPv6	118	Echo (ping) reply id=0x0

```
[+] Frame 1: 86 bytes on wire (688 bits), 86 bytes captured (688 bits) on in
terface eth0, id 0
[+] Ethernet II, Src: Xensourc_ee:00:0c (00:16:3e:ee:00:0c), Dst: IPv6mcast_
[+] Internet Protocol Version 6, Src: 2001:db8:f:1:216:3eff:feee:c, Dst: ff02::1
[+] Internet-Control-Message-Protocol-v6
```

0000	33 33 ff ee 00 0a 00 16 3e ee 00 0c 86 dd 60 00	33..... >.....`
0010	00 00 00 20 3a ff 20 01 0d b8 00 0f 00 01 02 16	... :.
0020	3e ff fe ee 00 0c ff 02 00 00 00 00 00 00 00 00	>.....
0030	00 01 ff ee 00 0a 87 00 5d e6 00 00 00 00 20 01].....
0040	0d b8 00 0f 00 01 02 16 3e ff fe ee 00 0a 01 01 >.....
0050	00 16 3e ee 00 0c	...>...

[hostB] 0: lxc* "ubuntu-focal" 09:23 31-Mar-22

Available tools

- Scapy
- THC-IPV6
- SI6 IPV6 Toolkit
- Termshark

Hints

- Feel free to **resize terminal windows** by dragging (does not work in Safari)
- To scroll inside the tmux, use **Ctrl-B** and **PageUp/PageDown** (**Fn + Up/Down** on Mac)
- To open new tmux window, use **Ctrl-B c**

RIPE NCC Academy in Numbers



RIPE NCC Academy in Numbers

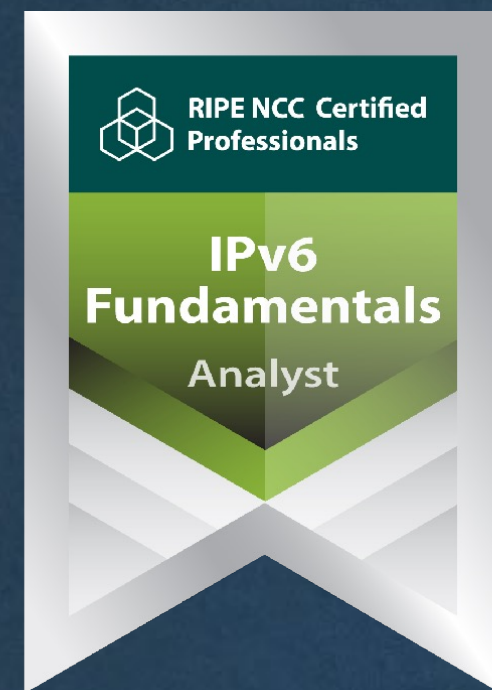


Top 10 countries with the **most visitors** overall

Netherlands	5603	+1	↑
Germany	4863	-1	↓
United Kingdom	3434	-	
United States	3297	+1	↑
Russia	3120	-1	↓
Spain	2839	-	
Italy	2660	-	
France	1723	-	
Poland	1216	+1	↑
Turkey	1206	+1	↑



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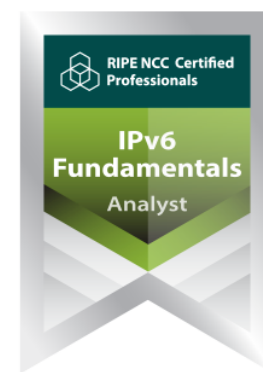
Click the button and a voucher code will be sent to jelcham@ripe.net

Claim voucher

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IPv6 Fundamentals - Analyst
Issued on 2021-03-03



IPv6 Security Expert
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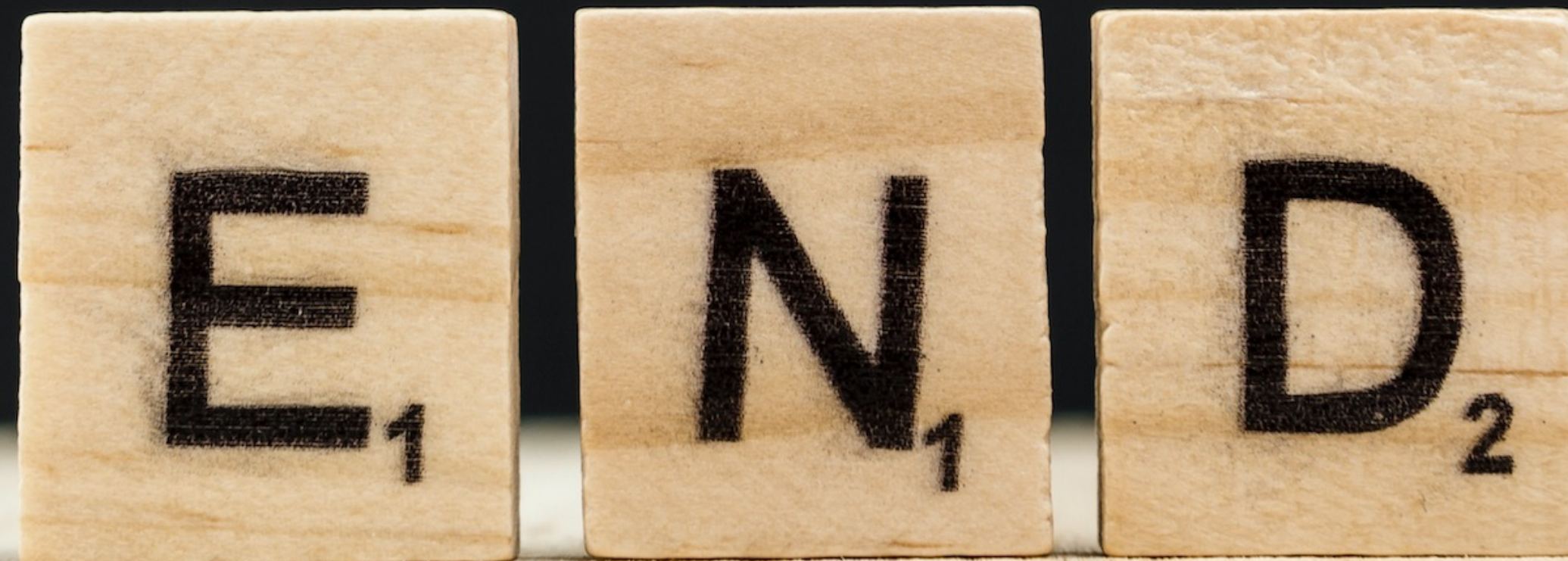


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[RIPE Database Associate certification](#)

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Fim	Slut					Pabaiga





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Questions



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