

# **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



# The RIPE community **The RIPE Network Coordination Centre**





Discussion forum open to everybody interested



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



### **RIPE Community**





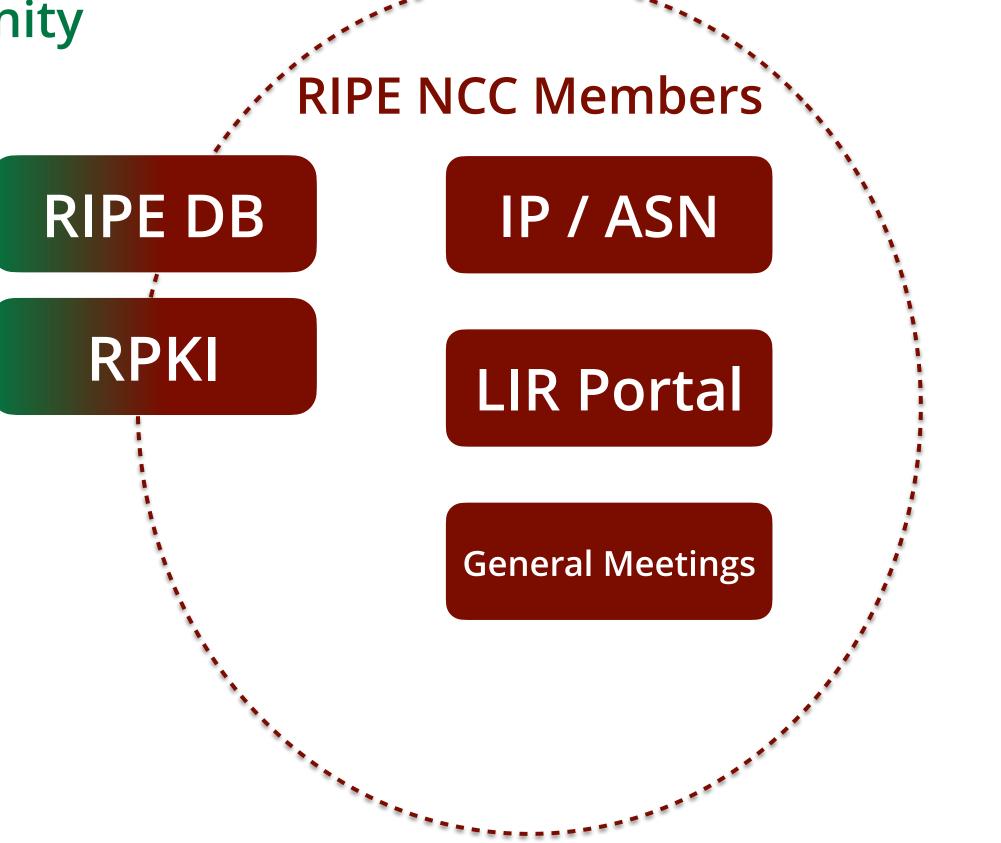
## **RIPE NCC Members**

\*

## **RIPE DB**

## IP / ASN

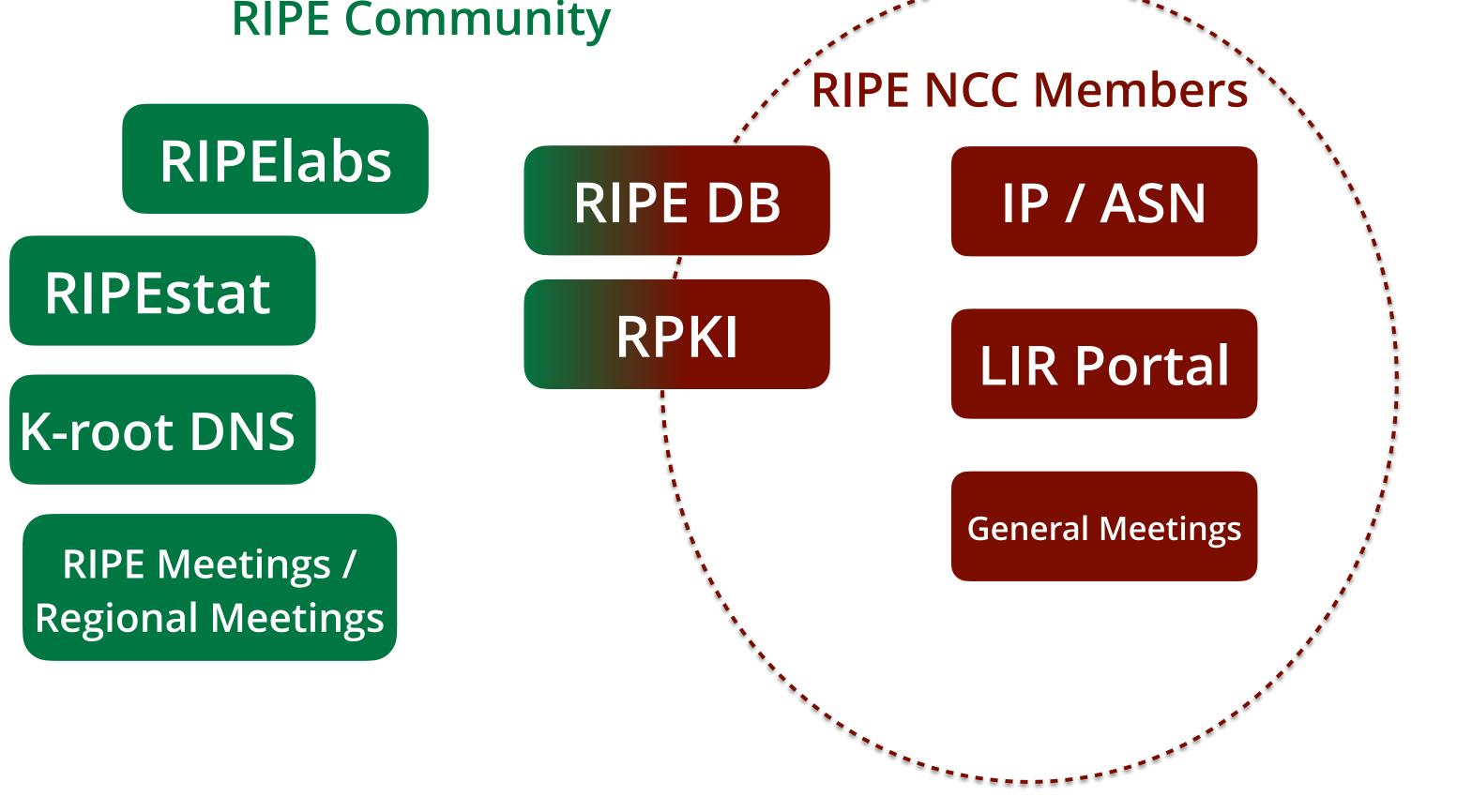
### **RIPE Community**





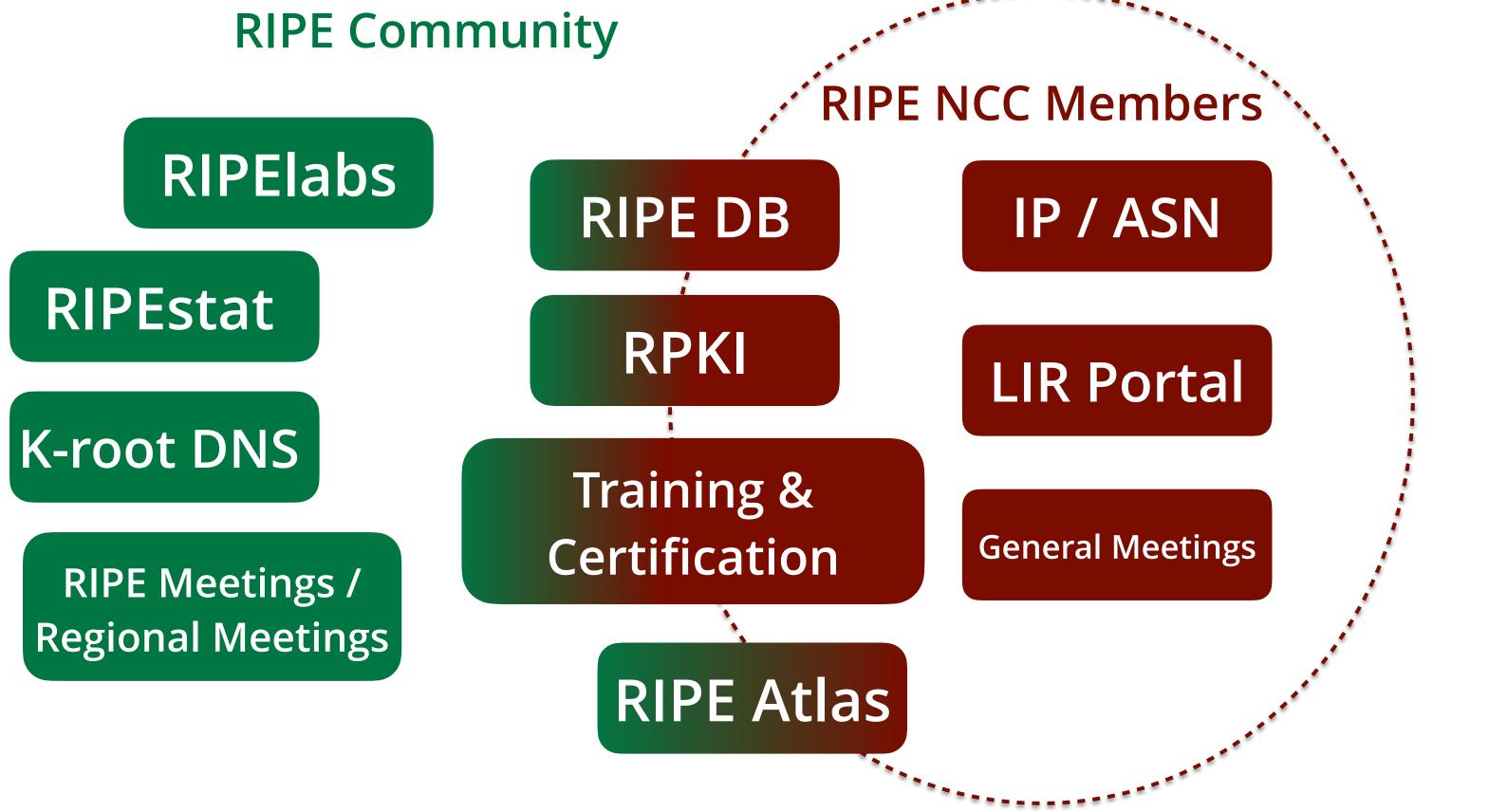


### **RIPE Community**









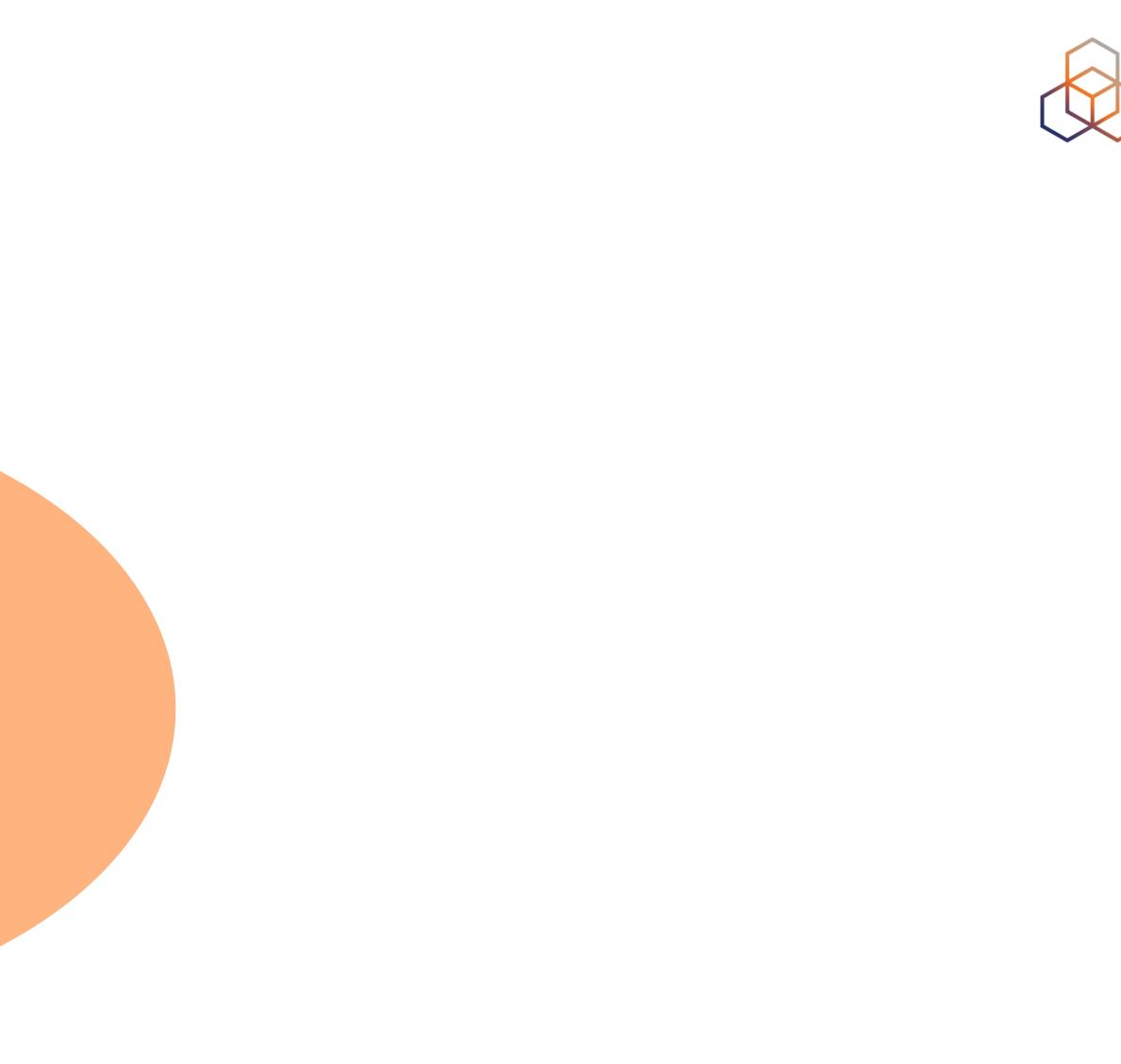




# Learning & Development

### 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**





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- 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**



# Learning & Development

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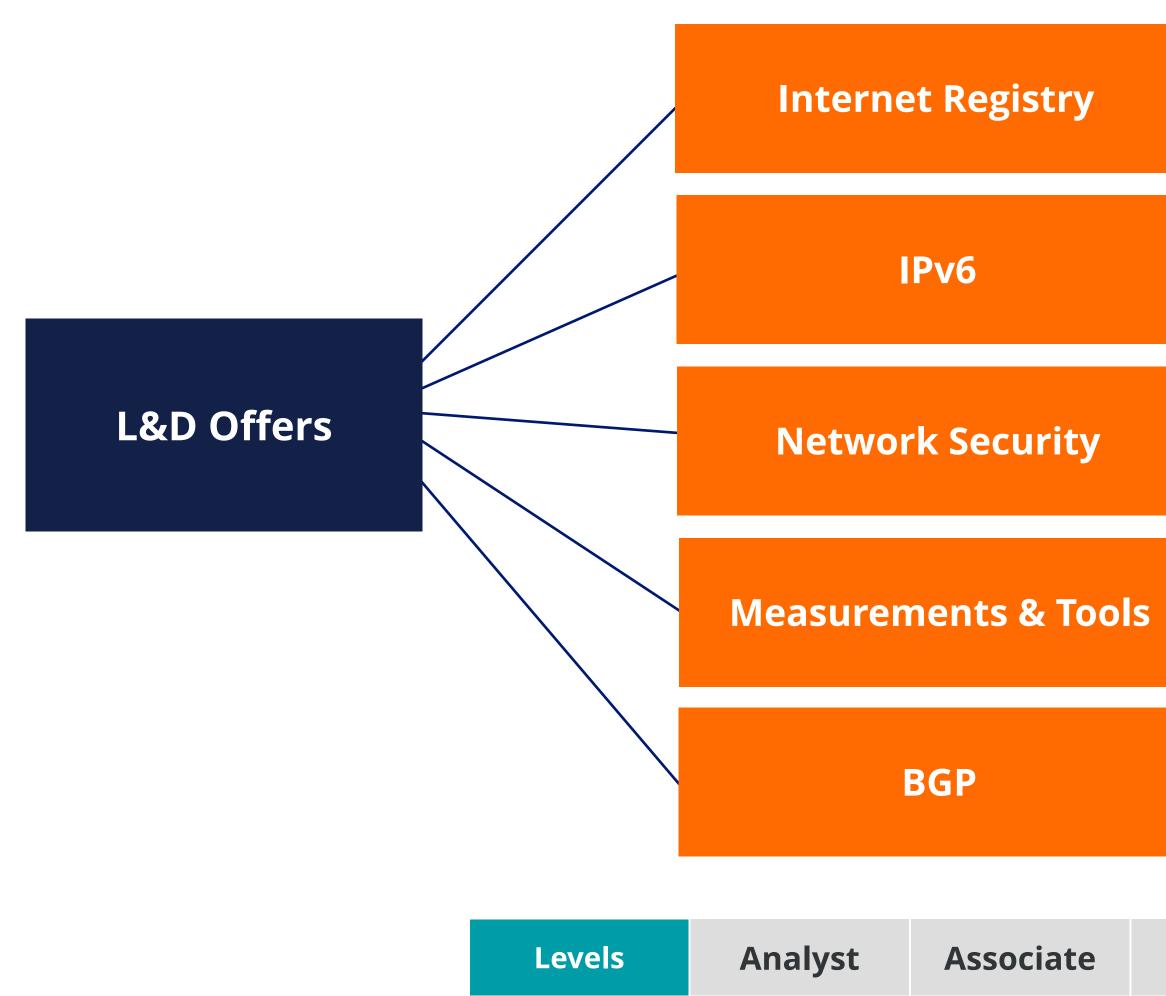
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### **Quality Assurance**

# **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

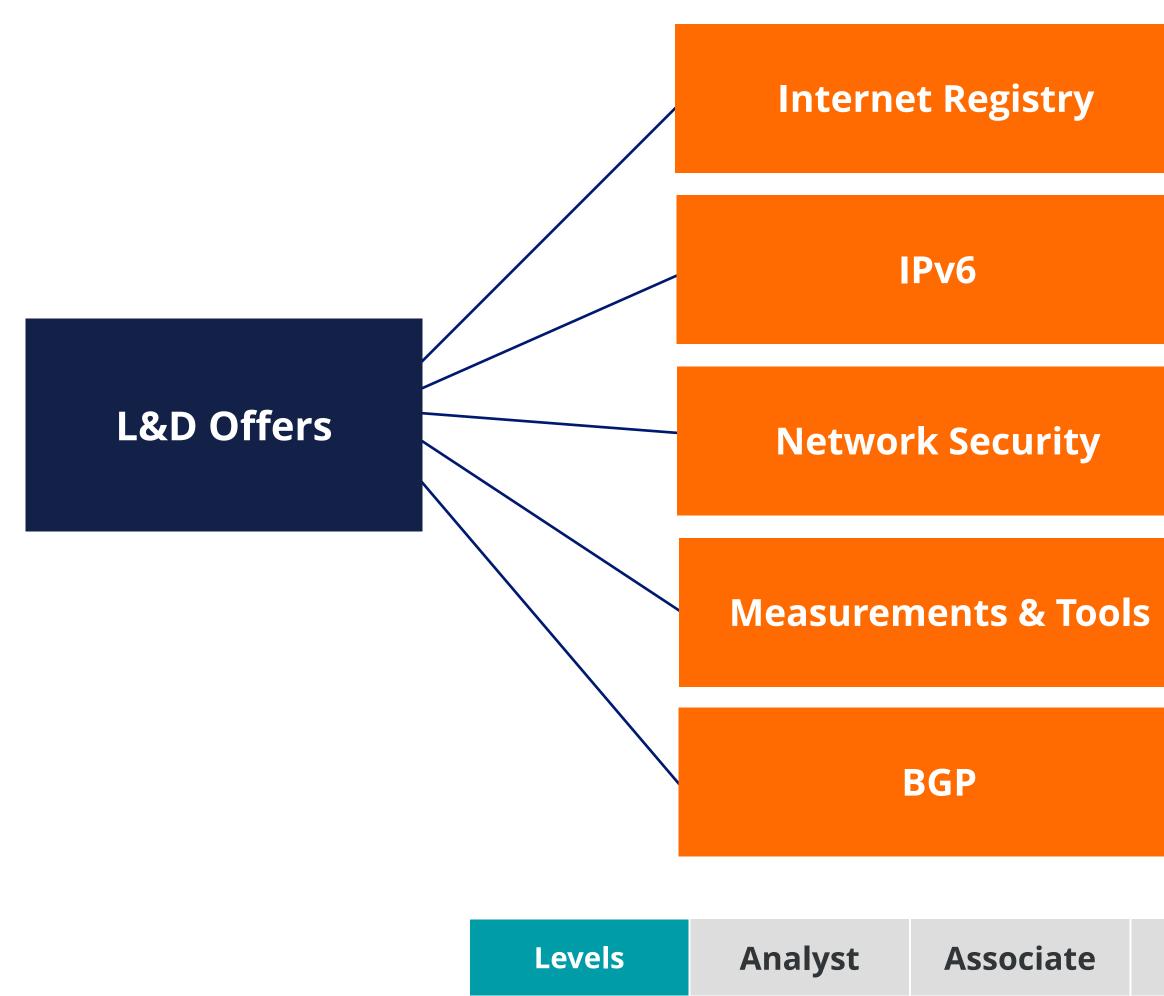






Expert







### By means of

Face-to-face courses

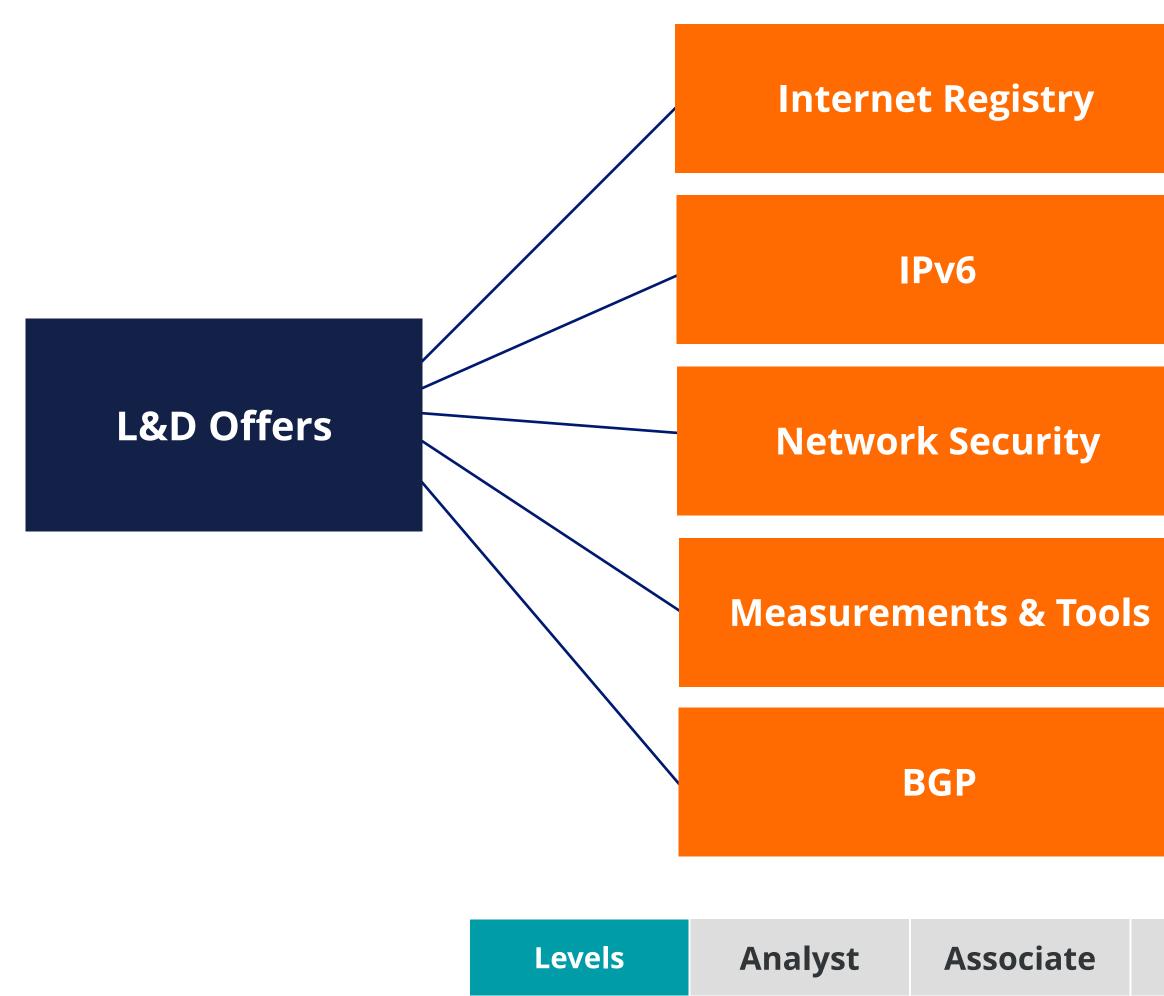
Webinars

**RIPE NCC Academy** (e-learning)

**Certified Professionals** (exams)

Expert









Face-to-face courses

Webinars

**RIPE NCC Academy** (e-learning)

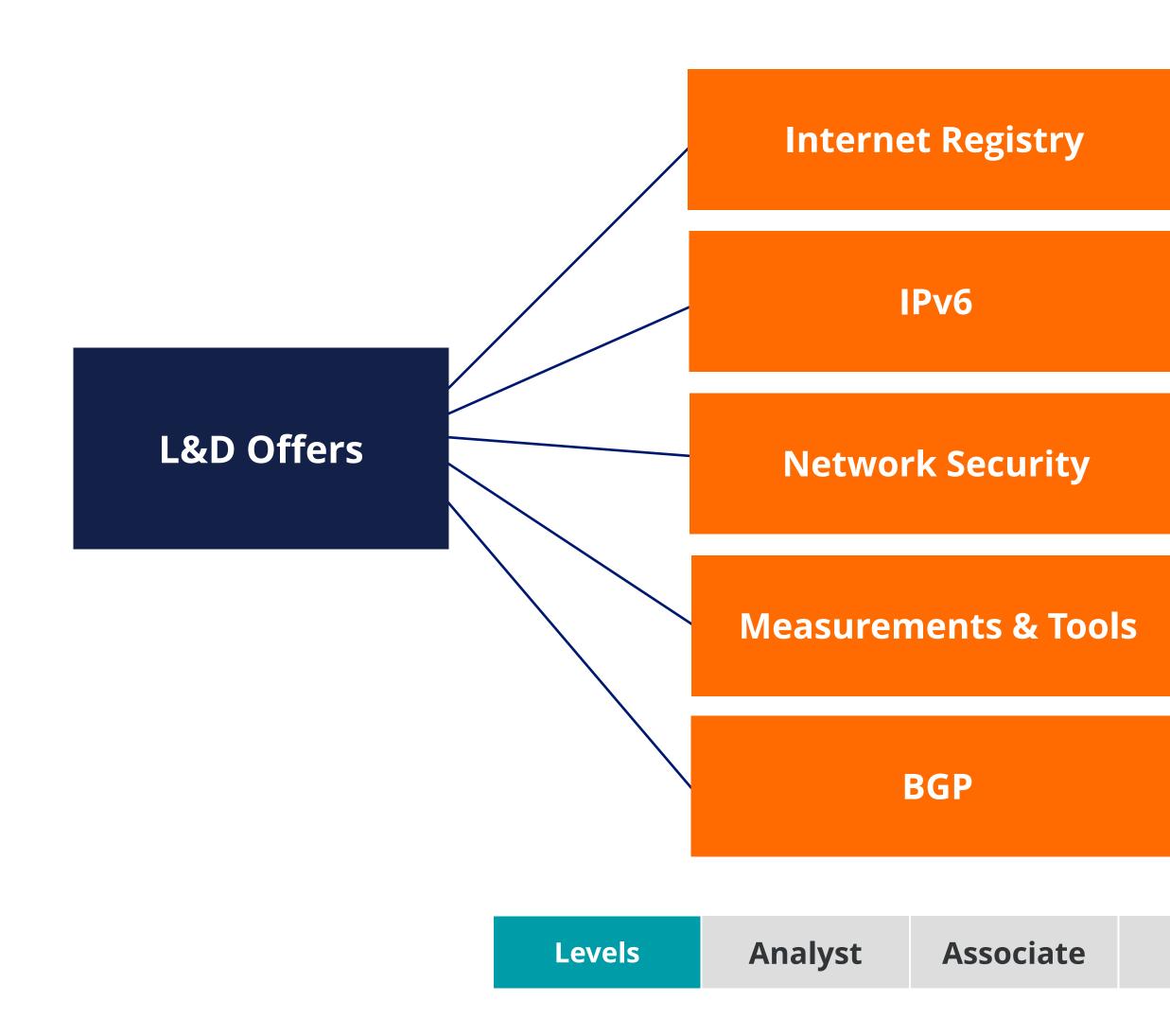
**Certified Professionals** (exams)

Members\*

Members\*

Expert









Face-to-face courses

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RIPE NCC Academy (e-learning)

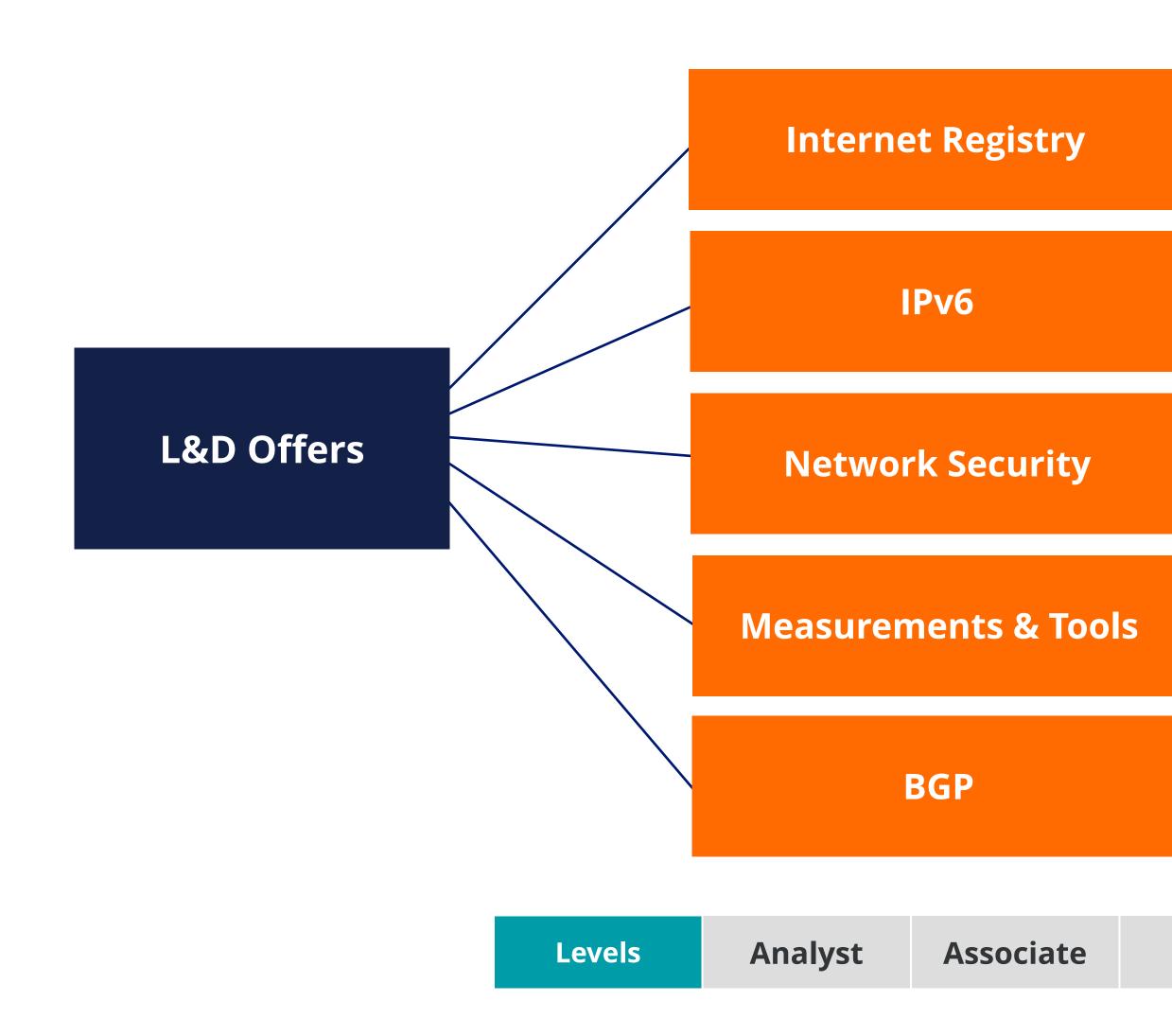
Certified Professionals (exams) Members\*

Members\*

Open and Free

Expert







### By means of

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**RIPE NCC Academy** (e-learning)

**Certified Professionals** (exams)

Members\*

Members\*

Open and Free

Members 3 free exams/year Open with price

Expert





# **RIPE NCC Learning**

## RIPE NCC RIPE NETWORK COORDINATION CENTRE

### Upcoming Courses and Webinars









UPCOMING COURSES WEBINARS CATALOGUE MORE HOME

CONTACT US

Q È

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



















🕀 RIPE NCC Academy

## **Learn online with the RIPE NCC!**

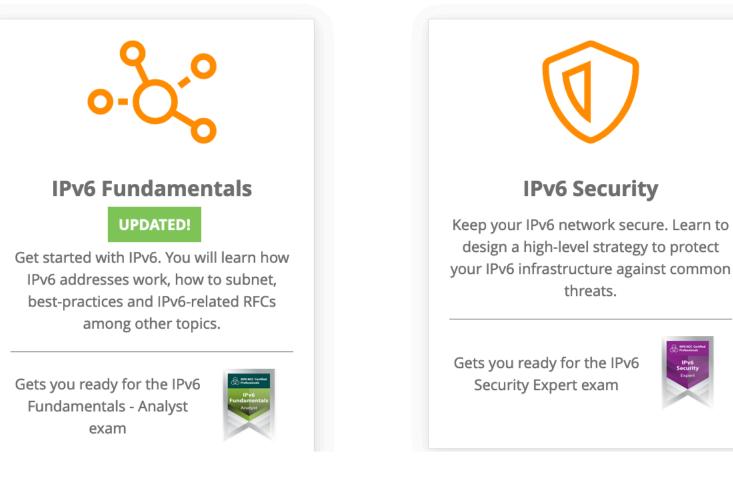
Study at your own pace online with the RIPE NCC Academy e-learning courses.

Create an account and enrol in the course of your choice. All courses are free, and you can follow them at your own pace. You can also study for a RIPE NCC Certified Professionals exam using these courses.

Enrol in a Course

**Get Certified** 

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





### You are not logged in. (Log in)



### **Browse courses**



threats.







### **RIPE Database**

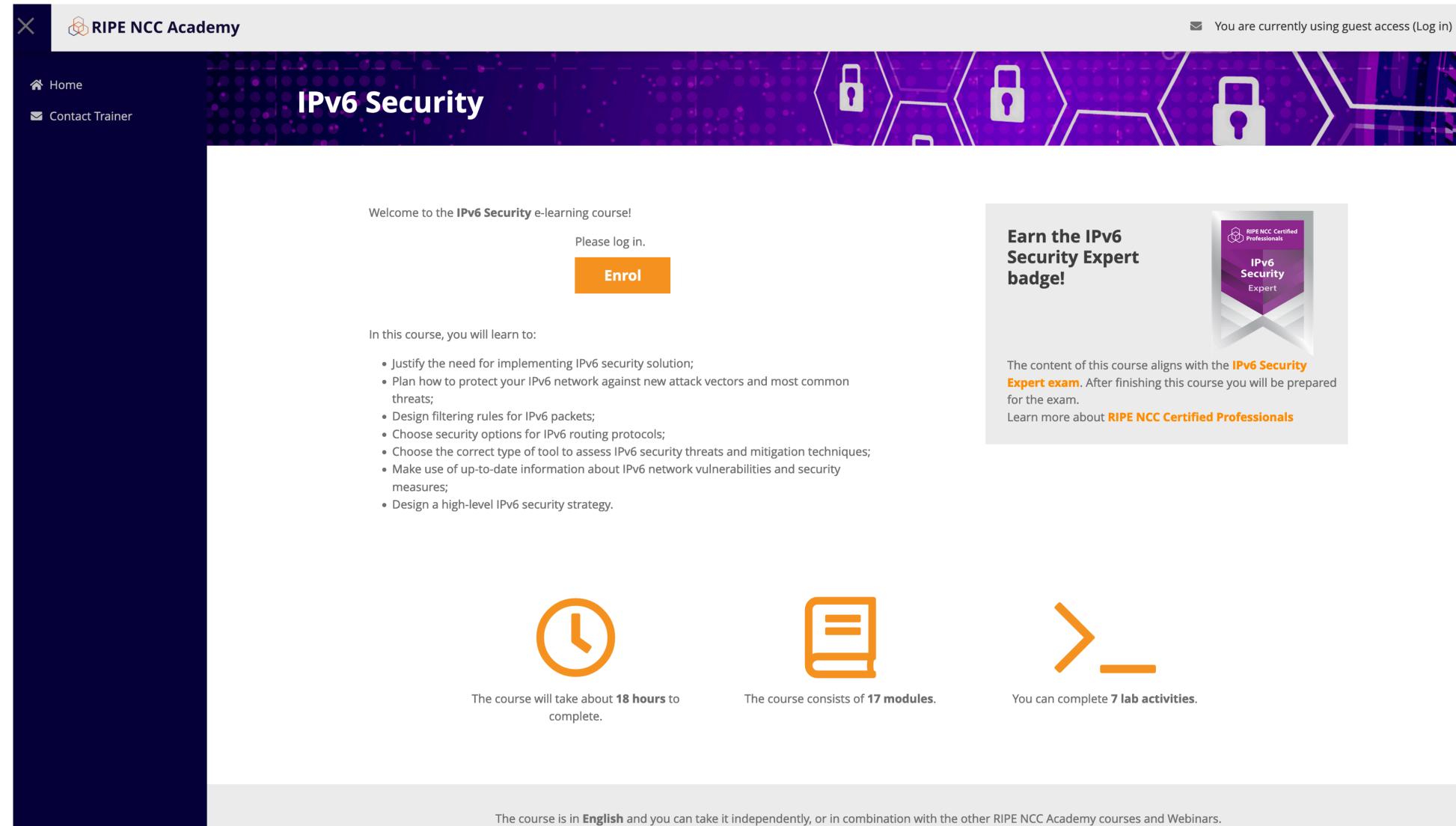
Learn how the RIPE Database works. Practise querying, creating and updating objects. Understand database bestpractices and more.

Gets you ready for the RIPE Database Associate exam













RIPE NCC Acad	🛞 RIPE NCC Academy				
🕆 Home	2.3 - IPsec				
2 Dashboard	Q	≡			
Contact Trainer	Module 2.3 - IPsec				
Course Overview					
Unit 1 - Introduction	100% COMPLETE				
Unit 2 - Basic IPv6 Protocol Security	= Overview				
Unit 3 - Associated IPv6 Protocol Security	▼ IPSEC SECURITY PROTOCOLS				
Unit 4 - Internet-wide IPv6 Protocol Security	Authentication Header				
Unit 5 - High Level IPv6 Protocol Strategy	Encapsulating Security Payload				
Guidelines	Practice: IPsec Modes & Security Protocols				
Ø Give Us Feedback ₂	■ Summary				

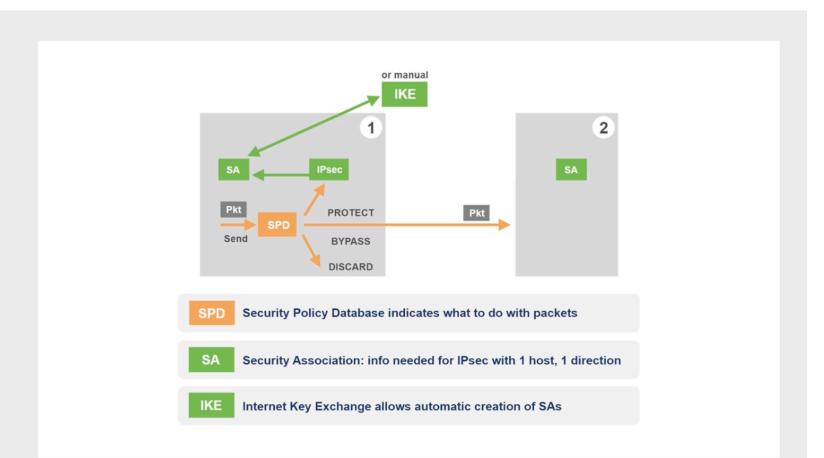


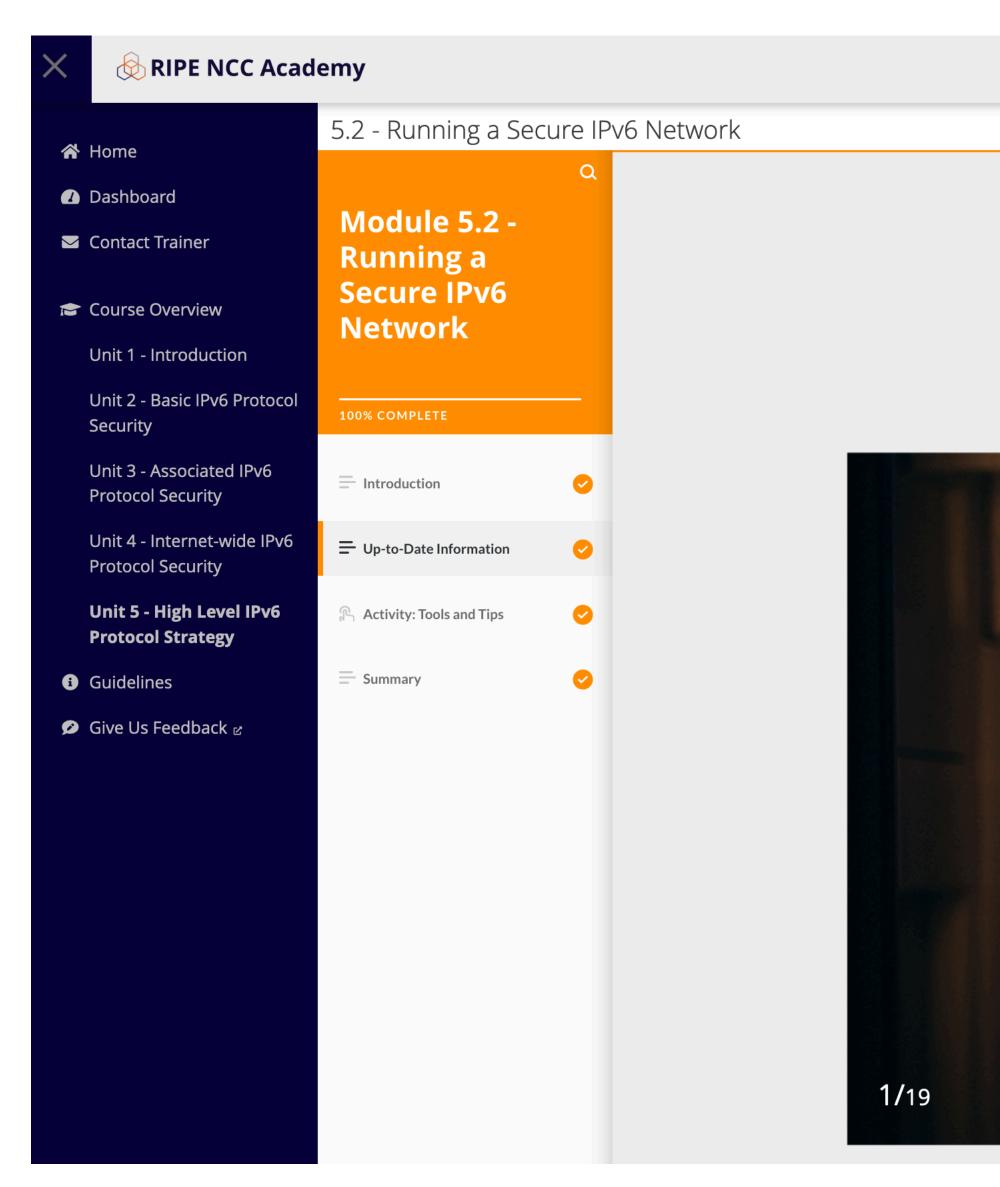
Section 1 of 5

### **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.



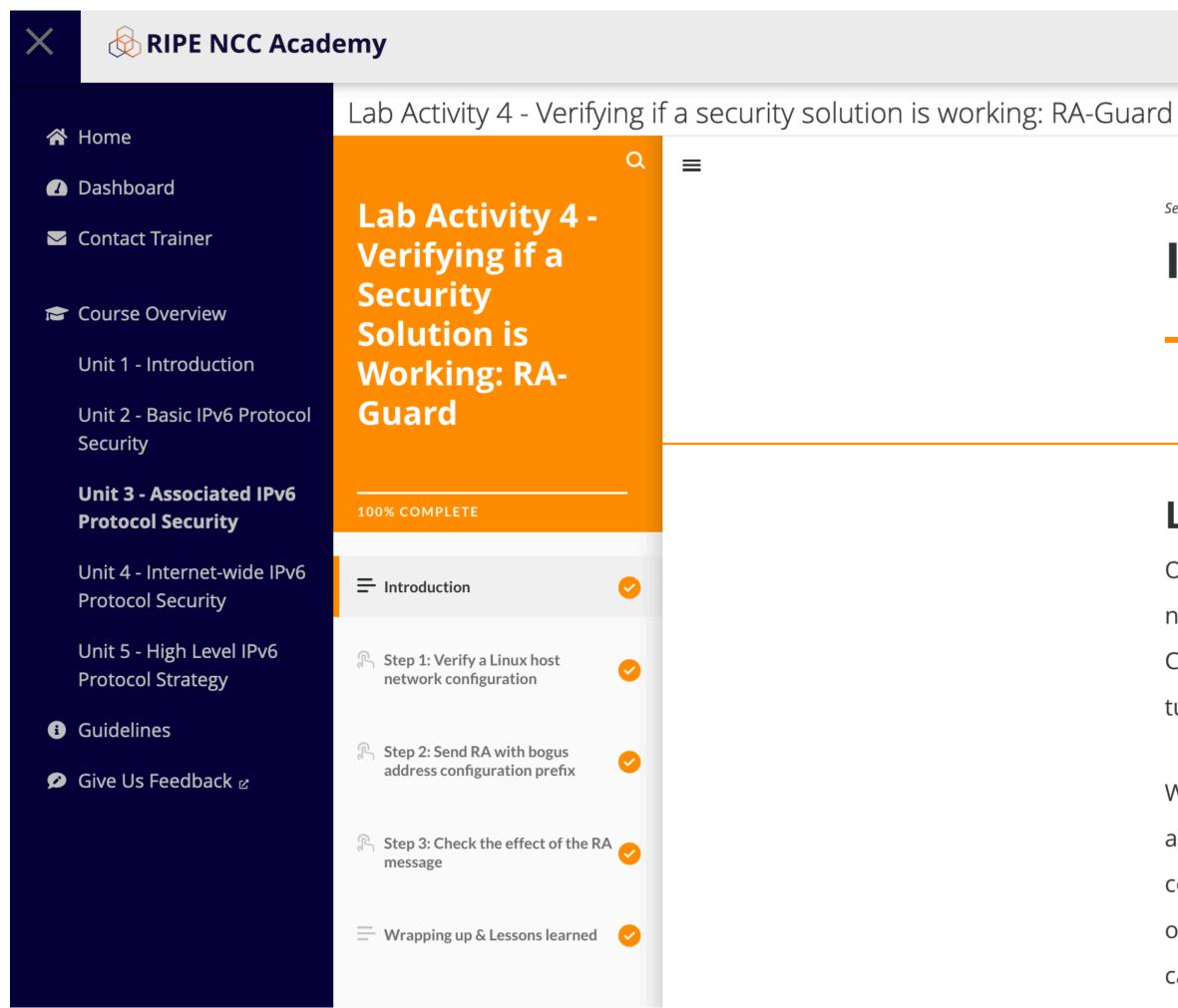




Let's explore an example of how you would check for vulnerabilities in your IPv6 network. This example is related to datacenters based on FreeBSD servers. It will help you understand the investigation process that starts with the identification of vulnerabilities and ends with finding possible solutions.









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 finetune 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.





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Dashboard Access to the servers' consoles



Network diagram How are the machines connected

### 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 glen 1000</loopback,up,lower_up>	
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00	
inet 127.0.0.1/8 scope host lo	No. Time – Source – Destinatio Protocol Length Info –
valid_lft forever preferred_lft forever	1 0.0000 2001:db8:f ff02::1:ff ICMPv6 86 Neighbor Solicitation fo
inet6 ::1/128 scope host	2 15.734 fe80::216: ff02::1 ICMPv6 142 Router Advertisement fro
valid_lft forever preferred_lft forever	
	J J
4: eth0@if5: <broadcast,multicast,up,lower_up> mtu 1500 qdisc noqueue state</broadcast,multicast,up,lower_up>	· · · · · · · · · · · · · · · · · · ·
UP group default qlen 1000	
<pre>link/ether 00:16:3e:ee:00:0a brd ff:ff:ff:ff:ff:ff link-netnsid 0 inct 102 0 2 140/24 brd 102 0 2 255 scene global dynamic stb0</pre>	x61b 17.172 2001:db8:f 2001:db8:f ICMPv6 118 Echo (ping) reply id=0x0
inet 192.0.2.140/24 brd 192.0.2.255 scope global dynamic eth0	1b6,d
valid_lft 3119sec preferred_lft 3119sec	[+] Frame 1: 86 bytes on wire (688 bits), 86 bytes captured (688 bits) on in
<pre>inet6 2001:db8:f:1:216:3eff:feee:a/64 scope global dynamic mngtmpaddr valid lft 3545coc proferred lft 3545coc</pre>	e eth0, id 0
valid_lft 3545sec preferred_lft 3545sec	[+] Ethernet II, Src: Xensourc_ee:00:0c (00:16:3e:ee:00:0c), Dst: IPv6mcast_
inet6 fe80::216:3eff:feee:a/64 scope link	[+]eInternet Protocol Version 6, Src: 2001:db8:f:1:216:3eff:feee:c, Dst: ff0
valid_lft forever preferred_lft forever	[+]1Internet—Control—Message—Protocol—v6—————————————————————
root@hostA:~# 🗌	
	0000 33 33 ff ee 00 0a 00 16 3e ee 00 0c 86 dd 60 00 33
	0020         3e         ff         fe         e0         00         ff         02         00         0
	0030 00 01 ff ee 00 0a 87 00 5d e6 00 00 00 20 01]
	0040 0d b8 00 0f 00 01 02 16 3e ff fe ee 00 0a 01 01
[hostA] 0:lxc* "ubuntu-focal" 09:22 31-Mar-22	0050 00 16 3e ee 00 0c> [hostB] 0:lxc* "ubuntu-focal" 09:23 31-Mar-22
[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:	<pre>icmp_seq=6 ttl=64 time=0.149 ms</pre>
64 bytes	from	2001:db8:f:1:216:3eff:feee:a:	<pre>icmp_seq=7 ttl=64 time=0.135 ms</pre>
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:	<pre>icmp_seq=10 ttl=64 time=0.120 ms</pre>
64 bytes	from	2001:db8:f:1:216:3eff:feee:a:	<pre>icmp_seq=11 ttl=64 time=0.130 ms</pre>
64 bytes	from	2001:db8:f:1:216:3eff:feee:a:	<pre>icmp_seq=12 ttl=64 time=0.210 ms</pre>
64 bytes	from	2001:db8:f:1:216:3eff:feee:a:	<pre>icmp_seq=13 ttl=64 time=0.052 ms</pre>
64 bytes	from	2001:db8:f:1:216:3eff:feee:a:	<pre>icmp_seq=14 ttl=64 time=0.054 ms</pre>
<b>^</b> C			
<pre> 2001:db8:f:1:216:3eff:feee:a ping statistics</pre>			
14 packets transmitted 14 received 0% packet loss time 13/1/1ms			



Admin console Control the VM itself

Legal Ŷ Copyright, Privacy, Terms and Cookies



### Host B

<u>reconnect</u>	pop	out

### Availaible 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
- • • • •

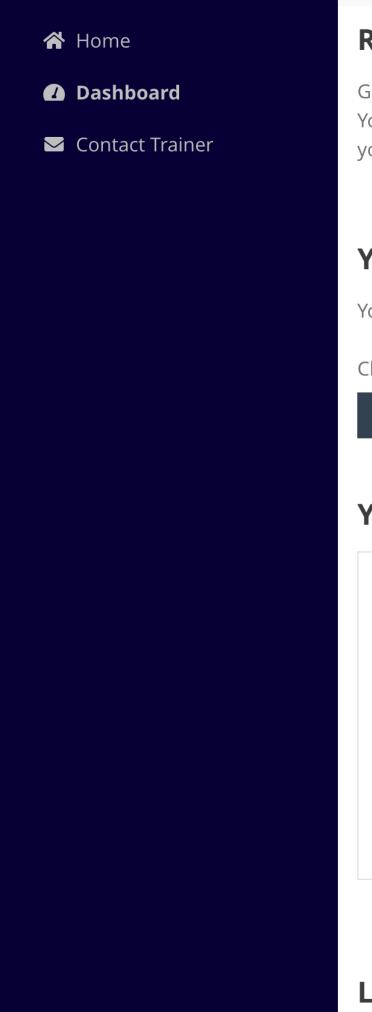






# **Claim your vouchers!**

### 👧 RIPE NCC Academy



### **RIPE NCC Certified Professionals**

Get certified by the RIPE NCC. When you pass our exams, you prove your skills to a network of Internet professionals. You will earn a verifiable digital badge that you can easily share online. You can schedule and take an exam online, under the supervision of a live, remote proctor. Once you take the exam, you will be able to see your results instantly, and if you are successful, you will be able to receive and display your digital badge!

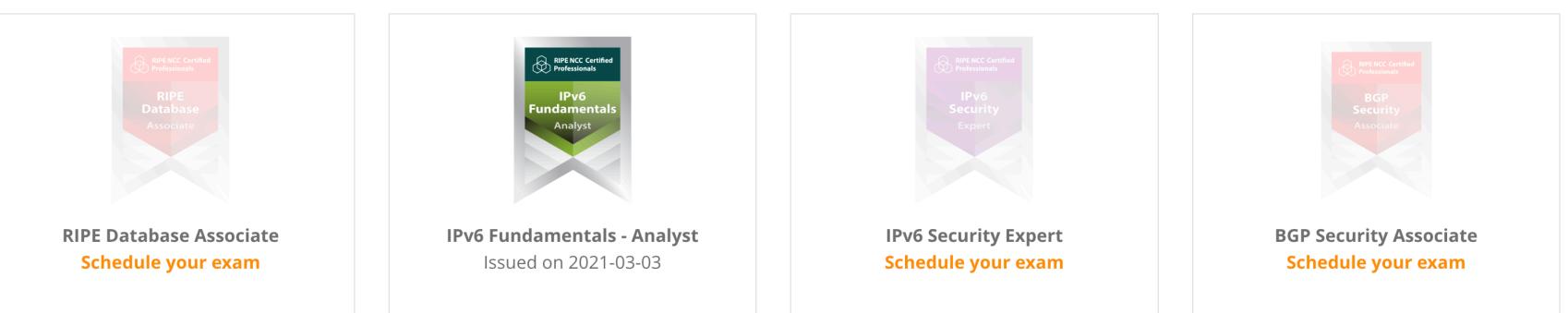
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Click the button and a voucher code will be sent to **jelcham@ripe.net** 

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# Questions

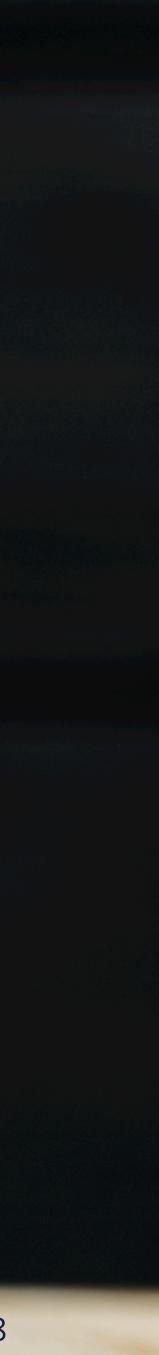




## Jad El Cham - jelcham@ripe.net



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# **Useful Links**

- **RIPE NCC Academy**: <u>https://academy.ripe.net</u>
- **RIPE NCC Certified Professionals**: <u>https://getcertified.ripe.net</u>
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