

Educating Yourself about IPv6

At this point in time, there are not enough people with both IPv6 experience, and training skills, to provide you with IPv6 training in the same way that you earn a CCIE. Of course, router vendors can teach you how to configure their devices and they do provide a wealth of published material that covers some of the experience of IPv6 pioneers. However, we are just beginning to see significant deployment of IPv6 in the real world harsh operational conditions of the Internet. This is likely to raise any number of issues which were unknown to the people who wrote existing books and training materials.

Documenting the problem: IPv4 exhaustion/depletion

- [Geoff Huston](#) (more conservative)
- [Hurricane Electric](#) (more aggressive)
- [The IPv4 depletion site](#) (most aggressive)
- [InfoWeapons](#) (must complete form to download whitepaper) (more aggressive)
- [Cisco's Tony Hain](#)
- [CAIDA](#) (older analysis)

Papers and Presentations

You must make a commitment to seek out the up-to-date experience of other people who are on the same journey as you, scaling up IPv6 to replace IPv4 in the Internet. A lot of this up-to-date material will be in published papers and conference presentations. We hope that you will share links to that material here.

There are about 200 papers and presentations on IPv6 available from [the IPv6 Eprints Server](#).

The Defense Research and Engineering Network (DREN) has published an [IPv6 Security Assessment](#).

Since IPv6 was first introduced, there have been many changes to the protocol with many RFCs updated or deprecated. Unfortunately, this means that some books have incorrect information, and even recent authors may have the wrong impression about how IPv6 should be implemented/deployed. Brian Carpenter from the IETF recommends these two books as containing the most up to date explanations of IPv6.

- IPv6 for all (free book). [Available in English and other languages](#).
- [Migrating to IPv6](#) by Marc Blanchet
- [IPv6 Essentials](#) by Silvia Hagen
- [IPv6, Theorie et pratique](#) (French)

The 6DEPLOY project makes available about [25 tutorials in PDF format](#) that cover a variety of IPv6 topics such as Multicast, Network Management, Addressing and so on.

There is an Internet draft available clarifying how [the IPv6 subnet model differs from IPv4](#).

Home Labs

Here are a couple of articles about setting up a small-scale IPv6 test lab for educational purposes.

- [Part 1](#)
- [Part 2](#)

Here is a brief overview of the [tools used to set up an IPv6 lab](#) using virtual machines on a virtual network.

[NetKit](#) bills itself as the poor man's system to experiment with computer networking. Downloads are available.

Here is a Usenix paper on [building a virtual IPv6 lab](#) using UserMode Linux virtualization. UserMode Linux (UML) has been widely used to build virtual network lab environments.

If you have Cisco licences then you might want to use [DynaGen](#), a front end for [DynaMIPS](#), the Cisco emulator. DynaGen makes it easier to run multiple instances of simulated routers for lab training purposes. Here is the [DynaGen tutorial](#).

[Build an IPv6 Router on Linux](#) with NAT-PT and use this between your home IPv6 PCs and your IPv4 Internet access connection. Although the IETF has deprecated NAT-PT to historical status, it does work and some people feel that it is superior to [6to4 Relay](#). The best way to find out is to experience both of them for yourself.

Free Books

It's always better if you can get your employer to buy a full library of IPv6 books for you, but if you are trying to come up to speed on your own dime, you might want to read a [free book on IPv6 and Internetworking with Cisco routers](#).

If you know of any other books that can be freely downloaded, please add them here.

- [An IPv6 Deployment Guide](#)
- [Day One: Exploring IPv6](#) (Junos specific, free login required, mobile versions available)
- [IPv6 eBook Series: Part 1 — The Basics](#)
- [IPv6 eBook Series: Part 2 — Network Preparations](#)
- [IPv6 eBook Series: Part 3 — Migration](#)
- [IPv6 eBook Series: Part 4 — Provisioning](#)

E-Learning Tools

- Introductory tutorial available at [6DISS Website](#) (no longer updated, replaced by [6DEPLOY](#)).
- Numerous tutorials are downloadable from [6DEPLOY](#) including such topics as addressing case studies, IPv6 routing, multicast, security, deployment scenarios, and so on.
- [US DoD High-Performance Computing Educational materials - DoD HPC IPv6 Training and Learning](#)

Training

There's a lot of generic IPv6 training out there, but here's a few worth highlighting:

- [CellStream, Inc. and The Online School of Network Sciences](#) offers Hands On IPv6 training, plus check out these free how to's:
 - [Experimenting with DHCPv6](#)
 - [Experimenting with ICMPv6](#)
 - [A Wireshark IPv6 Configuration Profile](#)
 - [Setting Up an IPv6 Teredo Tunnel in Windows 7](#)
 - [Setting up an IPv6 ISATAP Tunnel in Windows 7](#)
 - [Setting up a 6to4 Tunnel in Windows 7](#)
 - [Neighbor Discovery \(ND\) Table in IPv6 Windows, Linux and MAC Machines](#)
 - [Links to Ubuntu IPv6 How To's](#)
 - [IPv6 Windows Command Line Examples](#)
 - [IPv6 MAC OSx Command Line Examples](#)
 - [IPv6 Linux Command Line Examples](#)
- [MAAWG](#) has a free hour-long [video](#) regarding e-mail for senders
- [SCTE](#) has both online and in-person training
- [Global Knowledge](#) has an [introductory](#) and [advanced](#) course
- If their training is anything like their [wiki](#) then [NIL Associates'](#) IPv6 [courses](#) are probably worth looking into
- [RIPE](#) has a [list](#) of training sources and experts
- [Erion](#) has been doing IPv6 training since 1999
- [Nephos6](#) has certified courseware, built by the guys from [Native6](#)
- [Training4IPv6](#) has a [list](#) and [categorization](#) of trainers
- [My IPv6 tutor](#) has free video-based self-training
- [Hurricane Electric](#) has [online training videos](#)
- [Sixscape Communications](#) has free [online IPv6 training](#)
- [SI6 Networks](#) offers hands-on [IPv6 security training](#)
- [Consulintel](#) host many documents and books.
- [Network Utility Force](#) has certified trainers, engineers and a certified course

Other informational sources

ARIN maintains some IPv6 information on their [V6-Info pages](#) and they also run tutorials at their twice yearly meetings. Here is the [Sunday V6 schedule for the Albuquerque meeting](#) which will happen on the 14th of October. In between V6 day and the main ARIN meeting there will be a [N ANOG meeting](#). NANOG and ARIN have one joint conference per year like this.

APNIC has a nice wiki too:

<http://icons.apnic.net/display/IPv6/Home>