IPv6 PROGRAM

A ten-week intensive online program providing comprehensive coverage of IPv6 technologies and strategies for transitioning enterprise networks to IPv6.

DePaul University’s IPv6 Program provides a comprehensive introduction to IPv6 technologies. The goal of the program is to educate IT professionals with an understanding of the key technologies and processes required to transition an organization from IPv4-only network to dual IPv4/IPv6 network infrastructures.

The program is ideally suited for network engineers, network managers, technology managers and others who are responsible for the planning or implementation of new IPv6 technologies. The curriculum is designed to be accessible and useful to managers, but also offers a rich technical curriculum for those in more technical roles.

The IPv6 Program is offered solely online. Program content will consist of instructor-led online video, reading materials, forum participation, homework assignments, hands-on labs and a final case study project. Networking labs will allow for application of theoretical concepts. Students will run specialized software on their home networks and will also connect to DePaul University’s infrastructure to perform lab exercises remotely.

YOU WILL LEARN ABOUT:

- Evaluating IPv6 transition requirements
- Designing an IPv6 transition business case and implementation plan
- IPv6 addressing
- Host Autoconfiguration, Neighbor Discovery and DHCPv6
- IPv6 packet format and router processing
- Dual-stack Web and DNS services
- IPv6 security
- IPv6 multicasting and Mobile IPv6
- Managing IPv6 networks
- Building an IPv6 test environment
- Deployment considerations
- IPv4/IPv6 coexistence: tunneling, Network Address Translation (NAT) techniques, 6to4, 6rd, ISATAP, Teredo and others
- Cisco configuration and testing for IPv6 routing: static routing, RIPng, OSPFv3, EIGRPv6, MP-BGP, multihoming, IPv6 VPNs
- Cisco configuration and testing for IPv4/IPv6 interoperability: IPv6 tunneling (GRE, 6to4), IPv6 over MPLS, NAT-PT, and NAT64
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On September 24, 2015, the free pool of IPv4 address space at the American Registry for Internet Numbers (ARIN) was fully depleted\(^1\), ushering in the current era where new IPv4 address blocks are no longer available in North America. Other Regional Internet Registries around the world are, similarly, critically low and will be depleted soon. The only long-term solution to this shortage is the transition to IPv6 technologies, which provide a nearly limitless address space. This presents a historic need for IPv6 training, as thousands of corporate networks and services must be transitioned to IPv6 over the next few years. Job opportunities for those with IPv6 expertise are increasing rapidly.

Native IPv6 services provide high performance, security and manageability, but interim translation solutions are also available to provide connectivity for legacy IPv4-only services. This program is designed to provide clear and practical information about IPv6 transition requirements, processes and technologies to both the managers who must design a business case for these changes and the network engineers who must implement these changes. Advantages and disadvantages of various transition options will be discussed throughout. Examples will be used to illustrate changes to hosts, servers, routers, firewalls and other network/security infrastructure that will be required.

CURRICULUM

INTRODUCTION TO IPv6


IPv6 TECHNICAL FUNDAMENTALS I

- IPv6 addressing. Address types and scopes. Multiple interface addresses and Source Address Selection. IPv6 packet format and router processing. Internet Control Message Protocol (ICMPv6).

IPv6 TECHNICAL FUNDAMENTALS II

- Address Autoconfiguration and Neighbor Discovery. Dynamic Host Configuration version 6 (DHCPv6). Changes to DNS and Web services. IPv6 multicasting. IPv6 mobility. IPv6 Quality of Service (QoS) support.

IPv6 ROUTING


DEPLOYMENT AND TRANSITION


IPv6 SECURITY AND THE FUTURE


\(^1\) https://www.arin.net/resources/request/ipv4_countdown.html
GENERAL INFORMATION

ADMISSION
Professional work experience in the administration, support or management of network services is recommended. Applicants are expected to have knowledge of IPv4 and Internet services. Acceptance into the program will be determined by the admissions committee on the basis of an applicant's overall qualifications, including work history and educational background.

A substantial commitment of time is required for this intensive course of study. Students must view 2 to 4 hours of streaming instructional video content per week using their own Windows® or Mac® workstation with a broadband Internet connection, in addition to completing text readings, written homework assignments, lab exercises and a case study assignment. Students must contribute to online class discussions and will be invited to join live online demonstrations and review sessions.

LAB EXERCISES
Students will be assigned hands-on lab exercises at regular intervals through the course to reinforce concepts learned. Required lab exercises will include configuration and testing of IPv6 hosts and servers, tunneling to IPv6 services, and configuring IPv6 static routing on a Cisco® router. Optional lab exercises will also be offered to allow network engineers to practice configuring Cisco® devices for RIPv6, EIGRPv6, OSPFv3, 6to4, 6PE, 6VPE and other protocols.

Some lab exercises will be done through the installation of publicly-available freeware on the student’s own workstation. Other lab exercises will be done via remote access to DePaul University servers that will be made available to students. Router configuration exercises will be completed using the DePaul CDM DLPod infrastructure, which allows students to pre-reserve pools of interconnected IPv6 hosts, firewalls, switches and routers that can then be configured and tested over a virtual private network (VPN) connection. Lab support via e-mail will be available throughout the course duration.

CLASSES
The Institute offers one section of the program each quarter. Students will have access to course materials through DePaul University’s Desire to Learn (D2L) course management system available at https://d2l.depaul.edu.

FACULTY
The program is taught by a team of three faculty: Gregory B. Brewster, PhD, is the Director of the Center for Advanced Network Studies at DePaul; Anthony Chung, PhD, teaches advanced coursework in network protocols and is an expert in protocol testing; and Jean-Philippe Labruyere, CCIE, is an expert in the implementation of IPv6 technologies on Cisco platforms. All three faculty have many years of experience teaching undergraduate and graduate coursework incorporating IPv6 technologies to students in the B.S. in Network Technologies (NT), M.S. in Network Engineering and Management (NEM) and M.S. in Computer, Information and Network Security (CINS) programs at DePaul’s College of Computing and Digital Media. All faculty will be available throughout the program both in person and through e-mail.
The college, through its School of Computing and its School of Cinema and Interactive Media, offers a variety of programs at the undergraduate and graduate levels. Over 1,000 students are enrolled in the college’s bachelor’s programs and over 2,000 students are enrolled in the master's and Ph.D. programs making the college’s graduate program one of the largest in the country. The college offers more than 200 courses each quarter, many in the evening, in several locations: the Loop Campus, the Lincoln Park Campus, the O'Hare Campus, the Naperville Campus, and the Rolling Meadows Campus. Most of the degree programs are also available exclusively online.

Current offerings at the undergraduate level include:

**Offerings at the undergraduate level include:**
- Animation B.S. / Animation B.A.
- Computer Games Development B.S.
- Computer Graphics and Motion Technology B.S.
- Computer Science B.S.
- Computing B.A.
- Digital Cinema B.S. / Digital Cinema B.A.
- Graphic Design B.F.A.
- Information Assurance and Security Engineering B.S.
- Information Systems B.S.
- Information Technology B.S. / Information Technology B.A.
- Interactive Media B.S.
- Math and Computer Science B.S.
- Network Technologies B.S.

Current offerings at the graduate level include:

**Offerings at the graduate level include:**
- Animation M.A.
- Applied Technology M.S.
- Business Information Technology M.S.
- Cinema Production M.S.
- Computer Game Development M.S.
- Computer Graphics and Motion Technology M.S.
- Computational Finance M.S.
- Computer Science M.S.
- Computer, Information and Network Security M.S.
- E-Commerce Technology M.S.
- Human-Computer Interaction M.S.
- Information Systems M.S.
- Information Technology M.A.
- IT Project Management M.S.
- Network Engineering and Management M.S.
- Predictive Analytics M.S.
- Software Engineering M.S.
- J.D./M.A. in Computer Science Technology
- J.D./M.S. in Computer Science Technology

**Master’s of Fine Arts**
- Animation
- Cinema
- Screenwriting

**Ph.D. in Computer and Information Sciences**

The Institute for Professional Development was formed by the college in 1984 to assist both individuals and businesses in keeping pace with the rapid development of computer technologies. The Institute currently offers a variety of intensive certificate programs in these areas:

- Advanced SQL
- Big Data and NoSQL
- Big Data Using Hadoop
- Cloud Computing Technologies
- Data Science for Business
- IPv6
- Java™ Developer
- Java™ Web Development
- .NET Web Developer
- Ruby on Rails®
- SQL Server® Business Intelligence
- SQL Server® Database Administration
- Web Development with JavaScript and HTML5
- Web Development with Python®

**APPLICATION PROCEDURE:**

Complete the enclosed application and return it with a non-refundable $40.00 application fee (check or money order made payable to DEPAUL UNIVERSITY) to:

DePaul University
IPv6 Program
Institute for Professional Development
243 S. Wabash Avenue, Room 301
Chicago, IL 60604-2300

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