
United States
Department of Veterans Affairs

**Training Plan
For
Internet Protocol Version 6 (IPv6)**



**Version 2.0
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SIGNATURE PAGE

The Department of Veterans Affairs (VA) Internet Protocol Version 6 (IPv6) Training Plan, Version 2.0 is approved by:

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1 BACKGROUND

Veterans Affairs (VA) recognizes that Internet Protocol version (IPv6) is a new technology and training of technical personnel is a key component of a successful transition.

The VA training workgroup started planning early in the process with a survey of the technical community to determine what potential audiences exist within the VA. As a result of the survey, three target populations were identified.

- Architectural population: Enterprise Architecture personnel, Network Managers, Technical Managers, Telecommunication Managers, Security Managers
- Operational population: Network Engineers, Network Specialists, System Developers, Telecommunications Specialists, Support personnel (This class involves hands-on laboratory sessions.)
- General population: Management and Users. A general introductory IPv6 video has been produced and is available on the VA Knowledge Network located at http://vaww.sites.lrn.va.gov/vacatalog/cu_detail.asp?id=23411.

2 TRAINING OFFERINGS

Training will be conducted by a training vendor and will meet the needs of both technical and non-technical VA personnel in five different phases:

- **Train-the-trainer:** Training will initially be presented in the traditional “train-the-trainer” format. Selected VA personnel will be trained in order to present the material to VA personnel in the field. Class size for this training has yet to be determined.
- **Architectural:** The architectural training is comprised of both theory and demonstrations, and is being developed specifically for technical VA personnel who will not need “hands-on” technical instruction. The expected enrollment in this course is 25. The classes in this phase will be video taped or recorded on DVD for use as a future training tool.
- **Operational:** The operational training comprises “hands-on” technical instruction, and includes both theory and hand-on exercises. This course is specifically designed for technical VA personnel. The expected enrollment in this is 11-13. The classes in this phase will also be videotaped or recorded on digital versatile/video disc (DVD) for use as a future training tool.
- **Specialized:** Some employees may require training in appliances which run on various operating systems and applications. In these cases, the course content of the primary training may not address this need, and specialized training may need to be developed by VA personnel who have been trained and certified.
- **General:** The video training mentioned above will be conducted by in-house personnel who have received IPv6 Certification after completing the previously-

mentioned train-the-trainer instruction. This training will be presented to VA personnel and may be tailored to different VA audiences. This training will be presented on video, DVD, or web based.

Course content will consist of technical as well as administrative topics.

3 CERTIFICATION

3.1 VA IPV6 CERTIFICATION

As a component of the training, participants will be required to pass an evaluation in order to obtain certification with IPv6. Certification requirements are listed below. During the initial phase of training (train-the-trainer), the certification exam will be designed and administered by the training vendor. Subsequent training and exams will be administered by those certified VA personnel who attended and passed the train-the-trainer course.

3.2 THE CERTIFICATION PROCESS

A major component of the training is an examination taken by the IPv6 course participants. Participants will be certified in IPv6 methodology when they pass the examination. All VA personnel must be certified to be allowed to work with VA IPv6-enabled equipment and the network.

The training vendors will conduct at least one trial class for selected VA personnel. This class will be the pilot for the certification process, and will use an evaluation methodology approved by the VA. The certification examination will be designed using input from participant and trainer evaluations, and participant and trainer round-table discussions.

VA personnel who attend and pass the course will be certified. The training vendor and those VA-certified personnel will conduct all subsequent phases of the course.

4 TRAINING REQUIRED

The transition from Internet Protocol version 4 (IPv4) to IPv6 will require training for network engineers, network administrators, security professionals, application developers, and business managers. The IPv6 challenge is to incorporate IPv6 training efforts into current VA and component and joint training programs, without creating redundancies. A list of the technical training topics is included in Appendix B.

Training is essential for the successful transition to IPv6. IPv6 contains an extended feature set, the implementation of which is still in the development stage. The current business model, which relies heavily on protecting the network with such equipment as intrusion detection devices and firewalls, requires re-engineering. These devices will require technology refreshes, and the respective administrators will require training and certification on the new technology.

Before IPv6 implementation can begin, the appropriate VA personnel previously identified by category should be IPv6 trained. All VA IT and Telecommunication staff should familiarize themselves with IPv6 prior to formal training to help determine and

identify which personnel need which type of IPv6 training. Training needs will be diverse and will likely be complex. For example:

- Systems managers must learn how to configure and manage IPv6 on network devices and upgrade servers to IPv6.
- Program managers and acquisition executives will need information in order to evaluate and purchase IPv6 capable products and services.
- Software developers will need to understand the impact of IPv6 on existing applications to select co-existence mechanisms.
- Network managers and operators will need to thoroughly understand IPv6 operations, routing in IPv6 networks, and network services such as Domain Name Service (DNS) and Dynamic Host Configuration Protocol (DHCP).

Those responsible for IA will require information on IPv6 security vulnerabilities.

5 TRAINING SCHEDULE

The following training has been scheduled. Regional Chief Technology Officers (CTO's) will identify 20 individuals (10 for the Architectural class and 10 for the Operations hands-on class) from their region to participate. Regions 1 and 2 will be given first priority for the classes in Salt Lake and Regions 3 and 4 will be given first priority for the classes in the Washington, DC area.

Training Type	Date	Class Size	Duration	Location
Architectural Pilot Class	10/23/07 – 10/26/07	20	3 ½ Days	Washington, DC
Operational Pilot Class	01/28/08 – 02/01/08	20	5 Days	Washington, DC
Architectural Class	2/12/08 – 2/15/08	20	3 ½ Days	Salt Lake City OI Field Office
Operational Class	2/18/08 – 2/22/08	20	5 Days	Salt Lake City OI Field Office
Architectural Class	3/4/08 – 3/7/08	20	3 ½ Days	Herndon, VA (Washington, DC area)
Operational Class	3/19/08 – 3/14/08	20	5 Days	Herndon, VA (Washington, DC area)
Security Issues	Week of 5/12/08	100 - 150	1 to 2 Sessions	VA InfoSec 2008
TBD	Week of 07/07/08	TBD	TBD	VA Information Technology Connection

				Conference
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6 COURSE DOCUMENTATION

All course material, including training manuals, instructor guides, instructor notes, user guides, video tapes, DVDs, participant evaluations and any other material designed for these training sessions becomes the sole property of the VA.

Appendix A – Acronyms/Abbreviations List

CTO	Chief Technology Officer
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Service
DVD	Digital Versatile/Video Disc
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ST&E	Security Test & Evaluation
VA	Veterans Affairs

Appendix B – Technical Training Topics

IPv6 Addressing/Routing/Packet Filtering

- IPv6 Header and Extension Headers
- IPv6 Addressing Architecture
- IPv6 Data Link protocols
- IPv6 and MPLS
- IPv6 and Layer-2 and/or Layer-3 VPN
- Deploying Dual-Stack
- ICMPv6 and Neighbor Discovery Protocol
- Routing with EIGRPv6
- Routing with OSPFv6
- Routing with MBGP
- Enable authentication for Routing Protocols
- Graceful Restart for Routing Protocols
- Implementing Anycast
- Configuring IPv6 Packet Filtering
- Troubleshooting the IPv6 Network
- IPv6 paradigm shift: “New Thinking”
- Implementing Security (IPv4 NAT to IPv6)
- Routing with RIPng
- Routing with Integrated IS-IS Protocol

Network Services

- QoS Provisioning (*Diffserv, IntServ, Traffic Class, Flow Label, etc.)
- IPsec (A, ESP)
- Mobile IP
- Using DHCP with IPv6 in troubleshooting/configuration capacity
- Using SSH with IPv6 in troubleshooting/configuration capacity
- Using SSH/Ping/Telnet/FTP/TFTP with IPv6
- Authentication/Authorization/Accounting with IPv6 (RADIUSv6)

- IPv6 Prefix delegation
- Firewall/IDS/IPS
- IPv6 Network Management (CiscoWorks, CSM, ACS, NetScout)-using these tools in an IPv6 environment*
- SNMP for IPv6 Network Management – (SNMPv3 – optional)
- Implementing Multicast Service (ASM, SSM) – optional

* indicates applicable to Operational Group training, only

End Points

- IPv6 Host Configurations (Solaris, MS Windows) – stateful and stateless DHCP
- Auto Configuration
- Dual-stack issues

Administrative Topics

- Contact lists
- Trouble reporting
- Change management