Aruba Certified Switching Professional (ACSP)
OFFICIAL CERTIFICATION STUDY GUIDE
(EXAM HPE6-A73)

First Edition

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Official Certification Study Guide (Exam HPE6-A73)
Richard Deal and Peter Debruyne

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About the Authors

Richard Deal is an independent consultant who designs wireless and wired networks and provides network management services for small companies. He has created and developed many networking courses and instructs IT professionals on the best ways to design and implement Aruba's wired and wireless network solutions. Richard has authored countless books on various networking topics.

Peter Debruyne was co-developer of the Implementing ArubaOS-CX Switching course. He is an Aruba Certified Edge Expert (ACCX, ACMX, and ACDX) and ACSP certified. Peter is an Aruba Certified Instructor and resides in Belgium.

Introduction

This book guides you through Aruba wired network solutions involving ArubaOS-CX switching products and features and helps you prepare for the Aruba Certified Switching Professional exam (HPE6-A73). You will learn the following:

- Implementing ArubaOS-CX switches, redundancy technologies, NetEdit switch management, link aggregation techniques, network analytics, and switch virtualization with HPE's Virtual Switching Extension (VSX)
- Configuring dynamic routing with Open Shortest Path First (OSPF), Border Gateway Protocol (BGP), Virtual Routing Forwarding (VRF), and policy-based routing (PBR)
- Implementing IP multicast routing involving IGMP and PIM
- Optimizing networks by incorporating Quality of Service (QoS) priorities and device groups
- Protecting the network using access control lists (ACLs) and traffic classifier policies
- Securing access with 802.1X, MAC authentication, captive portal, dynamic segmentation with user-based tunneling (UBT), and local and downloadable user roles

Aruba Education Services

Aruba Education Services offers comprehensive training and certification programs from fundamental to advanced levels across the Aruba product line.

To learn more about Aruba certifications and training, please visit: https://www.arubanetworks.com/support-services/training-services/

Audience

This book is designed for individuals wanting to continue their journey in understanding the various Aruba products and using best practice design guidelines to implement campus wired solutions

involving ArubaOS-CX switches and CX features. The audience includes network technicians, network engineers, network architects, and network presales individuals.

Assumed Knowledge

This is an intermediate-level guide that will leverage ArubaOS-CX switches and features to implement a campus-sized wired solution. It is assumed that you have a knowledge of basic switching technologies that is covered in the Configuring ArubaOS-CX Fundamentals (CXF) course.

Minimum Qualifications

Typical candidates for this certification are IT associates who want to learn about the ArubaOS-CX switching products and the features and protocols used to help implement a campus-switched network. It is assumed that you have the equivalent networking and switching knowledge covered in the Configuring ArubaOS-CX Fundamentals (CXF) course.

Relevant Certifications

The Aruba Certified Switching Professional (ACSP) certification validates that you have the intermediate knowledge and skills required to implement Aruba campus wired solutions involving ArubaOS-CX switches, CX switching features, and various standards-based protocols.

Preparing for Exam HPE6-A73

This self-study guide does not guarantee that you will have all the knowledge you need to pass the exam. It is expected that you will also draw on real-world experience and would benefit from completing the hands-on lab activities provided in the instructor-led training. However, the labs taught in the official course are provided for you here in this book assuming you have the correct hardware and software to perform the labs. This book covers the same material as the actual course. Therefore, to pass the certification exam, you should be intimately familiar with the material presented here. Aruba recommends reading the book and performing the labs three times before attempting the exam. Please note that successful completion of this book, corresponding course, or additional study materials alone does not ensure you will pass the HPE6-A73 exam.

Recommended Training

Recommended training to prepare for each exam is accessible from the ACDA exam page. For more information, please visit: http://www.arubanetworks.com/support-services/training-services/certified-switching-professional/.

Obtain Hands-on Experience

You are not required to take the recommended, supported courses, and completion of training does not guarantee that you will pass the exam. Aruba strongly recommends a combination of training, thorough review of courseware and additional study references, and sufficient on-the-job experience prior to taking an exam.

Exam Registration

To register for an exam, please follow the links provided at: http://www.arubanetworks.com/support-services/training-services/certified-switching-professional/.

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1 Introduction to Aruba Switching

OBJECTIVES

After completing this chapter, you should be able to:

- ✓ Compare and contrast the different AOS-CX switching models
- ✓ Describe the important features of the AOS-CX switching product line

Overview

This chapter introduces the AOS-CX products and features that are covered in this guide. AOS-CX switches and operating system was designed for both data center and campus networks. The AOS-CX switch hardware enhancements like HPE's ASICs, with over 20 years of design and development experience, Virtual Output Queuing (VOQ) for dealing with head-of-line blocking, deep packet buffers, always-on POE on the 6300 and 6400 switches, and many other hardware features are needed for both campus and data center networks. The operating system was designed from scratch. It has all your typical features needed in campus and data center networks; however, it has a lot of enhanced features that lead the industry, including enhanced API functionality, network analytics that go beyond what is available with SNMP and sFlow, highly resilient virtual switching with VSX, dynamic segmentation for securely controlling access and forwarding of traffic, and many other features that you will see throughout this guide. The future of switching with HPE is AOS-CX and this guide will provide an intermediate-level coverage for implementing campus wired solutions.

Note

Data center designs and features are covered in other Aruba-related courses. This guide focuses on campus solutions.

AOS-CX Switch Overview

In this first section, you will be provided with a brief introduction of the AOS-CX switching product line.

AOS-CX: Heart of Aruba'sCore, Aggregation, and Access

Figure 1-1 AOS-CX: Heart of Aruba'sCore, Aggregation, and Access

The AOS-CX software forms the heart of Aruba's strategy for campus core and aggregation switching, as shown in Figure 1-1. Its programmable nature rests on open REST APIs, which enable external applications to securely view and configure all components of the system. Developers can use Python, a familiar scripting language, to script interaction with the REST API as well as to create Network Analytics Engine (NAE) agents for system monitoring and troubleshooting. AOS-CX is extensible. It is built to support micro-services and, with its open API, to integrate with other workflow systems and services.

The AOS-CX takes an innovative approach to high availability and fault-tolerance. The software architecture supports resiliency; for example, a process that fails can roll back to a good state using the stateful database. AOS-CX has even been honored by the industry for its innovation. CRN awarded the 8400 switch 'Product of the Year 2017' in large part due to NAE. NAE takes the guess-work out of troubleshooting and optimization and will be a game-changer for many customers.

Finally, the AOS-CX is secure and forms the bedrock for a trusted infrastructure. In addition to standard security features such as access control lists (ACLs), the AOS-CX supports a trusted boot

process. The software will not boot unless every hardware component checks out as authentic and free from malware and rootkits.

Note

Configuration version roll back may cause issues when going between major AOS-CX software versions.

What Does AOS-CX Mean to Customers?

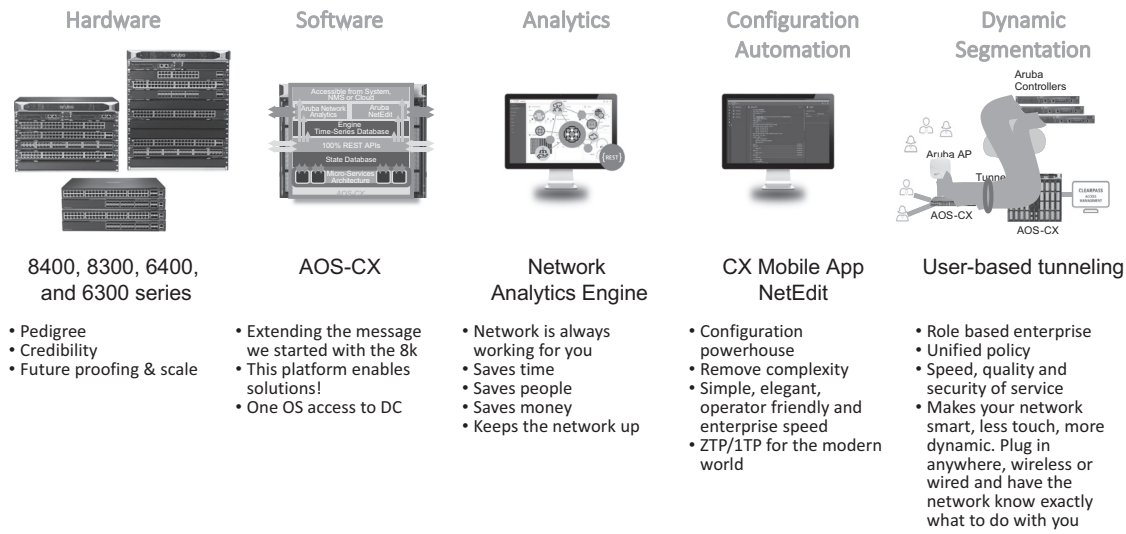

Figure 1-2 What Does AOS-CX Mean to Customers?

By deploying the AOS-CX switches in a campus or data center network, customers get all the benefits of an advanced operating system and the HPE Gen7 ASIC family (Figure 1-2). They get a combination of:

- Proven technologies including dynamic segmentation, which unifies wired and wireless access, enhances and simplifies policy enforcement, and protects IOT and other critical devices
- New hardware that brings together Gen 7 HPE ASICs with Virtual Output Queuing, Smart Rate ports, and up to Class 6 PoE
- The AOS-CX operating system with its modern architecture enables a seamless REST interface, with support for the exclusive Network Analytics Engine
- A set of advanced tools that cover:
    - Enhanced deployment (zero-touch or one-touch) via the CX mobile app
    - Advanced configuration management with NetEdit