About the Book

This book will give you a High Level of overview of the Service Provider Network Design and Architecture.
It talks about the unique aspects of Service Provider networks, different types of Service Providers and the business relationships between them.
It covers the Service Providers services, different last mile access offerings and transport networks, and their subscribers and services.
Technical explanation about different types of Fixed and Mobile network services and the service provider physical locations are also explained.
You will see the Big Picture of service Provider Networks.
After understanding the Service Provider Concepts and Technologies, a fictitious National Service Provider network, named ATELCO will be introduced, to give you a more view of the technologies, protocols, services and end to end traffic flow in great detail.
And at last the Evolving Technologies in the Service Providers and Massively Scale Datacenters will be seen.

Introduction

Service Provider Networks in many ways are unique networks. Many services might be serving to millions of customers, so there might be many paths between different parts of the network as you will see in the book. There are many different types of Service Providers but there is very little information about some of them. For example, Internet Service Providers, Broadband Service Providers, Transit Service Providers and Backbone Service Providers.
I have been teaching the unique aspects of Service Provider networks, explaining the services, many different access last mile offerings and transport network in my Service Provider Design Workshop courses. I have been encouraged several times by the students to write a book about the topics which was covered during the classes and this book effort started last year.
This book is organized in 9 Chapters.
Chapter 1 will start with explaining different types of Service Providers. Without going into technical details, it will explain the business relationship between different types of Service Providers and their subscribers and services.
Chapter 2 will be little bit more technical and will explain different types of Fixed and Mobile network services such as XDSL, FTTX, Cable Broadband, Fixed and Mobile Satellite, Wireless Internet Service and Mobile Broadband LTE (Long Term Evolution).
Chapter 3 will be covering the different types of Transport network fundamentals. Information in this chapters will be used in the next chapters. Fiber optic, Microwave, Comparison of Fiber and Microwave, SONET/SDH, WDM and Dark fiber will be covered. Also terrestrial and Sub

Marine/Undersea Cable Systems and the components of these systems will be introduced.

Page 3

Chapter 4 will be covering the physical locations where mainly Service Providers use to keep their servers, networking devices and security systems. Locations and the terminology which are used for them are unique to the Service Provider networks. POP, Meet-me room and Carrier Hotel are some examples to those places.

Chapter 5 will show the big picture of a Service Provider. Many information which was covered in the previous chapters will be helpful to demonstrate an end-to-end topology of a sample Broadband/Internet Service Provider network. The sample Service Provider in this chapter will provide XDSL Access, FTTX Access, Cable Access, Mobile Broadband, Fixed Broadband Wireless, WiMAX. In this chapter, these services will not be explained again. In this chapter you will understand how those services fit in to the end to end Service Provider network architecture.

Chapter 6 was the first topic when this book was started to be prepared. Interconnection between the networks. Service Providers have business relationship with many different types of companies. In these business relationship, they mostly connect to other Service Provider networks, Content Provider and Content Delivery Networks. These business relationships can be both Settlement based and Settlement Free Based. Many different types of Service Provider business models will be introduced in this chapter and will go into some technical details as well.

Chapter 7 A Service Provider network will be built from scratch. Services, Technologies, Protocols which you can see in the Access and Transit Internet Service Providers and LTE networks will be explained briefly in this chapter. ATELCO is a fictitious National Service Provider which has 11 million customers from Residential and Corporate segments.

Chapter 8 is explaining the Service Provider Network which was built in the Chapter 7 in detail. Presenting the alternative methods for ATELCO and explaining the technologies, protocol, services and end to end traffic flow in great details. For better understanding Chapters 7 and 8, you should first read the previous Chapters of the book.

Page 4

Chapter 9 is a quick introduction to the technologies which are evolving in the Service Providers and Massively Scale Datacenters. Segment Routing, TI-LFA, EVPN, NFV, BGP in Massively Scale Datacenter Usage and Multicast BIER are the topics of this Chapter. This Chapter already gave me many ideas for the upcoming edition of this book and many other technologies which are emerging in Service Provider networks. The detail explanations for the ones in this book will be covered in the future version of this book based on the

readers feedback.
You can reach me out by sending an email to orhan@orhanergun.net

---

Contents at a Glance

Contents
