



IPTV Security

Protecting High-Value Digital Contents

David Ramirez, *Alcatel-Lucent, UK*

Television was one of the inventions that shaped the way society and culture evolved over the second half of the twentieth century. It had the powerful effect of shrinking the world which created a unified view of how things were. There continues to be an evolution of television and a migration towards a fully interactive and ubiquitous IPTV.

IPTV Security describes the science and history behind TV as well as detailed descriptions of all the architectural components that comprise an IPTV environment.

It covers subjects logically from the Head End passing through the aggregation network and concluding with the Home End environment. The countermeasures required to ensure the safe operation of the IPTV environment are also examined, including Digital Rights Management technologies, network level security and application level security. *IPTV Security* defines the security model for an IPTV environment, ensuring that all critical elements are covered and a layered approach to security is implemented.

This book is ideal for anyone responsible for IPTV security such as security officers and auditors working with internet services and telecommunications providers, phone and cable companies, content owners and security consultants and architects. It will also be of interest to networking and security engineers, software developers, network operators and university lectures and students involved in media, IT and security.

- One of the only books available on *IPTV Security*
- Provides a comprehensive view of IPTV components along with the associated threats and required countermeasures
- Detailed descriptions allow readers to understand the technology even if new to the field
- A complete reference guide to the security aspects of IPTV.

 **WILEY**
wiley.com



ISBN 978-0-470-51924-0



TN949.292
R173

IPTV Security

Protecting High-Value Digital Contents

David Ramirez

Alcatel-Lucent, UK



John Wiley & Sons, Ltd



E2008001745

Copyright © 2008

Alcatel-Lucent. All Rights Reserved.

Published by

John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester,
West Sussex PO19 8SQ, England

Telephone (+44) 1243 779777

Email (for orders and customer service enquiries): cs-books@wiley.co.uk

Visit our Home Page on www.wiley.com

All Rights Reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except under the terms of the Copyright, Designs and Patents Act 1988 or under the terms of a licence issued by the Copyright Licensing Agency Ltd, 90 Tottenham Court Road, London W1T 4LP, UK, without the permission in writing of the Publisher. Requests to the Publisher should be addressed to the Permissions Department, John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England, or emailed to permreq@wiley.co.uk, or faxed to (+44) 1243 770620.

Designations used by companies to distinguish their products are often claimed as trademarks. All brand names and product names used in this book are trade names, service marks, trademarks or registered trademarks of their respective owners. The Publisher is not associated with any product or vendor mentioned in this book. All trademarks referred to in the text of this publication are the property of their respective owners.

This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold on the understanding that the Publisher is not engaged in rendering professional services. If professional advice or other expert assistance is required, the services of a competent professional should be sought.

Other Wiley Editorial Offices

John Wiley & Sons Inc., 111 River Street, Hoboken, NJ 07030, USA

Jossey-Bass, 989 Market Street, San Francisco, CA 94103-1741, USA

Wiley-VCH Verlag GmbH, Boschstr. 12, D-69469 Weinheim, Germany

John Wiley & Sons Australia Ltd, 42 McDougall Street, Milton, Queensland 4064, Australia

John Wiley & Sons (Asia) Pte Ltd, 2 Clementi Loop, #02-01, Jin Xing Distripark, Singapore 129809

John Wiley & Sons Canada Ltd, 6045 Freemont Blvd, Mississauga, ONT, L5R 4J3, Canada

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Library of Congress Cataloging in Publication Data

Ramirez, David.

IPTV security : protecting high-value digital contents / David Ramirez.

p. cm.

Includes index.

ISBN 978-0-470-51924-0 (cloth)

1. Internet television. 2. Computer security. I. Title.

TK5105.887.R36 2008

621.388—dc22

2007039302

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

ISBN 978-0-470-51924-0 (HB)

Typeset in 10/12pt Times by Integra Software Services Pvt. Ltd, Pondicherry, India

Printed and bound in Great Britain by Antony Rowe Ltd, Chippenham, England.

This book is printed on acid-free paper responsibly manufactured from sustainable forestry in which at least two trees are planted for each one used for paper production.

IPTV Security

I would like to take this opportunity to give special thanks to Luis Eduardo Niño for taking a chance and trying my ideas, even if they were based more on hope and ambition than on experience.

Also, I would like to give special thanks to Ramon Alonso Jaramillo for seeing beyond the obvious and allowing me to learn, and to Carlos Mario Toro and John Cuervo who guided my work and shared my enthusiasm for security.

Preface

Paraphrasing the famous quote from Karl Marx, I would say that television is the opium of the masses. If we have any doubts, we just need to look at the number of people glued to the TV every day. I fully understand this inclination. When I was young I spent most of my time looking at the world through the TV. Many images and sounds that now as an adult I try to revisit in person. For many of us, black-and-white TV is still a memory (not just a scary story or an urban myth!). We lived with just a few TV channels that started in the morning and by late afternoon were finished. Only in recent years have we had access to cable packages with hundreds of channels and basically any topic we may want to see.

For many years, TV has been a central mechanism for sharing culture. Although books, music and radio are helpful in bringing an insight into other worlds, audiovisual messages are more powerful and gain more attention from the audience. TV is also cheaper than live performances, and the audience is constantly growing as the number of TV sets per family increases. In many countries, TV channels are closely controlled by the political power, which ensures that only acceptable contents are presented to the public. New technologies may change this environment, allowing subscribers to choose what they see and select from different sources worldwide.

Being a TV fan, it was very interesting to get involved in the topic of IPTV. It was almost by accident that I was requested to write a chapter for an IPTV book in 2005. I had to jump head first into the subject and learn as much as I could about IPTV. One of the conclusions from my initial research on the topic was that information was limited, mostly linked with specific products, and some information lacked structure. This is a common situation with new technologies – there are very clever people developing the technology and they have little time to share all the details with the world.

I expanded the topic of IPTV in my MSc dissertation and, as a result of this additional research, concluded that writing a book on the specific aspects of security could be a positive contribution for those interested in the subject. The writing process became a very interesting journey as I was faced with the challenge of structuring in a coherent way a number of separate areas that span different knowledge domains. I tried to replicate my learning process in the book, bringing together all the diverse subjects that form IPTV in a single document that would allow the reader quickly to gain insight into the components and interactions within IPTV environments.

In general, most of the information available on the subject was either related to particular products or was work in progress expected to become a standard in the future. The book intends to provide detailed information about the different elements that comprise the IPTV environment, filling in some of the gaps left by available information.

The most exciting part of exploring IPTV is realizing how subscribers will have the power to control most aspects of their viewing experience. It may not start with the death of television as we know it, but in years to come subscribers will be able to choose exactly when and what type of content they want to access. Today we have a few IPTV deployments worldwide, and these are slowly gathering momentum. This technology will definitely become an alternative to satellite and cable.

Moreover, as we have seen with many other technologies, the first versions do have security vulnerabilities. More specifically, IPTV is a highly complex environment that brings together technologies from many different vendors, and this increases the potential for security problems. The journey of exploring the security of the IPTV environment clearly shows that there are hundreds of potential points of failure. Many components can become the weakest link and allow intruders to have access to digital assets or components within the IPTV environment.

Hopefully, this book will help security professionals gain a broader picture of the challenges and tools available to secure the environment and ensure that security incidents are reduced and controlled.

About the Author

David Ramirez

Senior Manager

Alcatel-Lucent Services

David Ramirez has been involved with information security for the past 13 years. He began his career as a networking specialist and then joined a consulting company managing information risk management practice where he was involved in risk assessments for more than 80 companies. His next move was to a risk management company in the UK, as part of their new information security division. In that role, Ramirez was responsible for developing the methodologies for the practice, including penetration testing, ISO 17799 compliance and disaster recovery. He was involved in security projects for banks and other financial institutions around the world. The projects focused on security awareness, disaster recovery and business continuity, security policies, security architecture, managed security services and compliance with international standards.

Ramirez is a member of Alcatel-Lucent's security consulting practice. His responsibilities include innovation and technology, thought leadership and knowledge sharing.

Contents

Preface	xv
About the Author	xvii
1 Introduction to IPTV	1
1.1 Introduction	1
1.2 General Threats to IPTV Deployments	3
1.2.1 Access Fraud	4
1.2.2 Unauthorized Broadcasting	5
1.2.3 Access Interruption	5
1.2.4 Content Corruption	6
2 Principles Supporting IPTV	9
2.1 History of Video and Television	9
2.1.1 Television	10
2.2 Viewing Experience of Video	15
2.2.1 Line Scanning	15
2.2.2 Video Resolution	15
2.2.3 Number of Pictures per Second	16
2.2.4 Aspect Ratio	16
2.2.5 Video Compression Method	16
2.3 Video Compression	16
2.3.1 MPEG-2	17
2.3.2 H.263	18
2.3.3 MPEG-4	18
2.4 TCP/IP Principles	19
2.4.1 Addresses	19
2.4.2 Routing	20
2.4.2.1 IP Packet	20
2.5 Summary	21
References	22
Bibliography	22

3	IPTV Architecture	23
3.1	High-level Architecture	23
3.1.1	<i>Service Types</i>	25
3.2	Functional Architecture for the IPTV Service	25
3.2.1	<i>Content Provision</i>	26
3.2.2	<i>Content Delivery</i>	26
3.2.3	<i>IPTV Control</i>	26
3.2.4	<i>Subscriber Functions</i>	26
3.2.5	<i>Security</i>	27
3.3	Detailed IPTV Architecture	28
3.3.1	<i>Head End (IPTV Service Provider)</i>	28
3.3.1.1	Critical Elements of the Head End	29
3.3.1.2	Content Input	30
3.3.1.3	MPEG Video Encoder	32
3.3.1.4	IP Encapsulator	33
3.3.1.5	Video Transcoder	34
3.3.1.6	Content Management Server	34
3.3.1.7	Video Repository	35
3.3.1.8	Digital Rights Management	36
3.3.1.9	Video Streaming Server	37
3.3.1.10	Subscriber Interaction	37
3.3.2	<i>Transport and Aggregation Network (IPTV Network Provider)</i>	40
3.3.2.1	RP and RTSP	49
3.3.2.2	RTSP	49
3.3.2.3	Ismacryp	51
3.3.2.4	PIM	52
3.3.2.5	MSDP	53
3.3.2.6	DSM-CC	53
3.3.2.7	Internet Service Provider	53
3.3.2.8	DSLAM	53
3.3.3	<i>Home End (Subscriber)</i>	57
3.3.3.1	Set Top Box	58
3.4	Summary	61
	References	62
4	Intellectual Property	63
4.1	Introduction	63
4.2	Supporting Technology	73
4.2.1	<i>Symmetric Key Cryptography</i>	73
4.2.2	<i>Asymmetric Key Cryptography</i>	74
4.2.3	<i>Hybrid Encryption</i>	74
4.2.4	<i>Hash – Digest</i>	74
4.2.5	<i>Commonly Used Algorithms</i>	75
4.2.6	<i>Public Key Infrastructure and ITU-T Recommendation X.509</i>	76
4.2.7	<i>Operation of PKI</i>	80
4.2.8	<i>Secure Socket Layer and Transport Layer Security</i>	81
4.3	General Mechanisms for Content Protection	82
4.3.1	<i>CPS</i>	82
4.3.2	<i>CAS</i>	83
4.3.3	<i>DRM</i>	83

4.4 Operation of DRM on IPTV	86
4.4.1 <i>DRM Applied to VOD</i>	87
4.4.2 <i>DRM Applied to Broadcast TV</i>	88
4.4.3 <i>Smart Cards and DRM</i>	88
4.4.4 <i>Storage Protection</i>	89
4.4.4.1 VCPS	89
4.4.4.2 CPRM/CPM (CPSA)	89
4.4.5 <i>Open DRMs</i>	89
4.4.5.1 SDMI	89
4.4.5.2 OMA DRM	90
4.4.5.3 DMP	90
4.4.5.4 MPEG21	91
4.4.5.5 MPEG21 REL Data Model	91
4.4.5.6 DVB-CPCM	91
4.4.5.7 DVB-CBMS	91
4.4.5.8 PERM	92
4.4.5.9 DCAS	92
4.4.5.10 DReaM	92
4.4.5.11 OpenIPMP	93
4.4.5.12 OpenCA	93
4.4.5.13 PachyDRM	93
4.4.6 <i>Interoperability Proposals</i>	93
4.4.6.1 Coral	93
4.4.6.2 DMP	94
4.4.6.3 SmartRight	94
4.4.6.4 SVP	94
4.4.6.5 OpenCP	95
4.4.6.6 OMArin	95
4.5 Watermarking and Fingerprinting	95
4.5.1 <i>History</i>	95
4.5.2 <i>Steganography Techniques</i>	98
4.5.3 <i>Watermarking and Fingerprinting Principles</i>	99
4.5.4 <i>Typical Attacks</i>	101
4.5.5 <i>Forensic Use of Digital Fingerprints</i>	103
4.6 WWW? (What Went Wrong?)	105
4.6.1 <i>Introduction</i>	105
4.6.2 <i>Satellite Television</i>	106
4.6.3 <i>DVD Protection</i>	107
4.6.4 <i>AACS on Blue-Ray and HD-DVD</i>	108
4.6.5 <i>Videos Over the Web</i>	110
4.7 Authentication	111
4.8 Summary	111
References	112
Bibliography	113
5 Existing Threats to IPTV Implementations	115
<i>Co-authored by Andrew R. McGee, Frank A. Bastry and David Ramirez</i>	
5.1 Introduction to IPTV Threats	118
5.1.1 <i>Specific Threats to IPTV Environments</i>	120
5.2 IPTV Service Provider – Head End	125
5.2.1 <i>Video Feeds – Live or Prerecorded (Physical Media, OTA, etc.)</i>	126

5.2.2	<i>Video Switch</i>	126
5.2.3	<i>Ingest Gateway (Video Capture)</i>	127
5.2.4	<i>Platform SW/OS – Stored/Running</i>	127
5.2.5	<i>Content Management System</i>	127
5.2.6	<i>Content Metadata from Video Repository</i>	128
5.2.7	<i>MPEG-2 Content from Video Repository</i>	128
5.2.8	<i>MPEG-4 Content</i>	128
5.2.9	<i>Load Balancer Software</i>	129
5.2.10	<i>Master Video Streaming Software</i>	129
5.2.11	<i>CA/DRM Service</i>	129
5.2.12	<i>SRTP Keys</i>	129
5.2.13	<i>Ismacryp Key</i>	130
5.2.14	<i>Key Management Protocol</i>	130
5.2.15	<i>CA/DRM Service Administration</i>	131
5.2.16	<i>VOD Application – Cached Video Content Metadata</i>	131
5.2.17	<i>Cached MPEG-2/MPEG-4 Content (Primary and Secondary Storage)</i>	131
5.2.18	<i>Video Streaming Software</i>	132
5.2.19	<i>Local Ad Insertion Authentication Information (e.g. User ID(s) and Password(s))</i>	132
5.2.20	<i>Local Ad Metadata</i>	132
5.2.21	<i>Local Ad MPEG-2/MPEG-4 Content</i>	133
5.2.22	<i>Local Ad Insertion Tracking Information</i>	133
5.2.23	<i>nPVR Application Recorded/Stored Content Metadata</i>	133
5.2.24	<i>Recorded/Stored MPEG-2/MPEG-4 Content</i>	134
5.2.25	<i>nPVR/Video Recording Software</i>	134
5.3	<i>IPTV Network Provider – Transport and Aggregation Network</i>	134
5.3.1	<i>Protocol Vulnerabilities</i>	134
5.3.2	<i>Content Distribution Service: Unicast Content Propagation – FTP or Other Transport Protocol</i>	137
5.3.3	<i>Multicast Content Propagation</i>	137
5.3.3.1	<i>IGMPv2/v3 (Snooping)</i>	137
5.3.3.2	<i>PIM (SM, SSM, Snooping)</i>	138
5.3.3.3	<i>MBGP</i>	139
5.3.3.4	<i>MSDP</i>	139
5.3.3.5	<i>MFTP</i>	140
5.3.3.6	<i>RTP</i>	141
5.3.4	<i>QoS Signaling (RSVP, DiffServ)</i>	141
5.3.5	<i>Management of Content Distribution Service</i>	142
5.3.6	<i>Connection Management Service</i>	142
5.3.6.1	<i>DSM-CC Protocol</i>	143
5.3.6.2	<i>RTSP Protocol</i>	143
5.3.6.3	<i>MPEG-2 Video Stream</i>	143
5.3.6.4	<i>MPEG-4 Video Stream</i>	144
5.3.6.5	<i>DSM-CC</i>	144
5.3.6.6	<i>RTSP</i>	145
5.4	<i>IPTV Subscriber – Home End</i>	145
5.4.1	<i>Set Top Box</i>	145
5.4.2	<i>STB Executing Software</i>	147
5.4.2.1	<i>DRM Software</i>	147
5.4.2.2	<i>Middleware Client SW</i>	147

5.4.2.3 STB Platform SW	148
5.4.2.4 DVR/PVR	148
5.4.2.5 STB Credentials	149
5.4.2.6 Digital Certificate (Software Provider)	150
5.4.2.7 STB Digital Certificate	150
5.4.2.8 Public Keys (Used for Digital Certificates)	151
5.4.3 <i>STB User Storage</i>	151
5.4.3.1 Downloaded Content	151
5.4.3.2 User-created Content	152
5.4.3.3 STB Smart Card	152
5.4.3.4 STB Credentials	152
5.4.3.5 STB Digital Certificate	153
5.4.3.6 STB High-definition Output Interface	153
5.4.3.7 DVI	154
5.4.4 <i>Residential Gateway</i>	154
5.4.5 <i>DSLAM</i>	154
5.4.5.1 Audience Metering Information	154
5.4.5.2 Fraud Control Information	155
5.4.5.3 IP Filters	155
5.4.6 <i>Broadcast/Multicast TV VLAN Service</i>	156
5.4.6.1 Decryption Keys	156
5.4.6.2 CWMP	157
5.4.6.3 NTP/SNTP	157
5.4.7 <i>Broadcast/Multicast TV Application</i>	158
5.4.7.1 MPEG-2 and MPEG-4 Video Stream	158
5.4.7.2 DSM-CC	158
5.4.8 <i>Middleware Application</i>	158
5.4.8.1 EPG	158
5.4.8.2 Menus	159
5.4.8.3 Subscriber Credentials	159
5.4.8.4 Purchasing Information	160
5.4.8.5 Digital Certificates (Content Provider)	161
5.4.8.6 Parental Controls	161
5.4.8.7 PVR/DVR Application	162
5.4.8.8 User-sourced Content	162
5.4.9 <i>Application Management</i>	163
5.4.9.1 IPTV Usage Information	163
5.4.9.2 IPTV Billing Information	164
5.5 Conclusion	165
6 Countering the Threats	167
6.1 Securing the Basis	167
6.1.1 <i>Hardening Operating Systems</i>	167
6.1.2 <i>Business Continuity</i>	172
6.1.3 <i>Intrusion Detection/Intrusion Prevention</i>	173
6.1.4 <i>Network Firewalls</i>	174
6.1.5 <i>Fraud Prevention</i>	175
6.1.6 <i>DRM-CAS</i>	176
6.2 Head End (IPTV Service Provider)	176
6.2.1 <i>Critical Elements of the Head End</i>	176
6.2.2 <i>Content Input</i>	177

6.2.2.1 Satellite Feed	177
6.2.2.2 Premium and Direct-feed Content, Pre-encoded Content Ready to be Encapsulated	178
6.2.2.3 Physical Media	179
6.2.3 MPEG Video Encoder and Video Transcoder Functions	179
6.2.4 IP Encapsulator	180
6.2.5 Content Management Server	182
6.2.6 Video Repository	182
6.2.7 Digital Rights Management	184
6.2.8 Video Streaming Server	187
6.2.8.1 IGMPv2/v3	188
6.2.8.2 MBGP	188
6.2.8.3 MSDP	188
6.2.8.4 RTP	188
6.2.8.5 RTSP Packets	189
6.2.8.6 RSVP	189
6.2.9 Middleware Server	189
6.3 Aggregation and Transport Network	190
6.3.1 DSLAM	190
6.3.1.1 Access and Session Control	191
6.3.1.2 Routing	193
6.3.1.3 User Segregation	193
6.3.1.4 Quality of Service	194
6.3.1.5 Virtual Networks and Virtual Circuits	194
6.3.1.6 802.1X Authentication	195
6.3.2 Firewalls	196
6.4 Home End	197
6.4.1 Residential Gateway	197
6.4.1.1 Filtering	197
6.4.1.2 Quality of Service	198
6.4.2 Set Top Box	198
6.4.2.1 Secure Processor	198
6.4.2.2 DRM	200
6.4.2.3 Output Protection	200
6.5 Secure IPTV a Reality	201
References	202
Appendix 1 Converged Video Security	205
A1.1 Introduction	205
A1.2 Threats to IPTV Deployments	205
A1.3 Protecting Intellectual Property	206
A1.4 VOD and Broadcast	207
A1.5 Smart Cards and DRM	208
A1.6 Countering the Threats	208
A1.6.1 Threat References	210
A1.6.2 Threat Models	211
Appendix 2 Federated Identity in IPTV Environments	217
A2.1 Introduction	217
A2.2 IPTV Federated Identity Solutions	217
A2.2.1 SAML for Security	218

A2.2.1.1 The SAML Process	218
A2.2.1.2 Reviewing Existing Standards	220
A2.3 Applicability to an IPTV Security Environment	220
A2.3.1 <i>Internal Applications</i>	220
A2.3.2 <i>Set Top Box Security</i>	221
A2.4 Video on Demand	221
 Appendix 3 Barbarians at the Gate	 223
A3.1 Barbarians at the Gate	223
A3.2 How to Break an IPTV Environment	224
A3.3 Network Under Siege	224
A3.3.1 <i>Confidentiality</i>	224
A3.3.2 <i>Integrity</i>	225
A3.3.3 <i>Availability</i>	225
A3.4 Countermeasures	225
A3.4.1 <i>Set Top Box</i>	225
A3.4.2 <i>DSLAM</i>	226
A3.4.3 <i>Routing</i>	227
A3.4.4 <i>User Segregation</i>	228
A3.4.5 <i>Quality of Service</i>	228
A3.4.6 <i>Virtual Networks and Virtual Circuits</i>	229
A3.5 Conclusion	229
 Index	 231

1

Introduction to IPTV

1.1 Introduction

Television is one of the inventions that has shaped the way society and culture has evolved in the past 60 years. Back in 1940, the first commercial television broadcast started a revolution, showing people of all ages how others lived outside their towns and cities. Television had a powerful effect, shrinking the world and creating a unified view of how things were.

In 1969, ARPANET was created, and a new stage in communications started. Then, in 1983, the core protocol of ARPANET went from NCP (Network Control Protocol) to TCP/IP (Transfer Control Protocol/Internet Protocol) and the Internet was born.

Both the TV and the Internet have revolutionized the way we live. We now have TV channels providing information 24 hours a day, and the Internet facilitating both communication and commerce. Several common areas between the two have finally drawn the technologies into merging, creating IPTV (Internet Protocol Television).

There are some differences between IPTV and IP video. Although the two terms are very similar, there is a clear distinction in the way the market is using the two. IPTV can be used to refer to commercial offerings by service providers with very close access to the subscriber and offers a number of TV channels with a similar look and feel to standard television. IP video is more common within websites and portals, offering downloadable contents and, in some cases, even TV shows and movies downloaded on demand. If it has a number of channels and acceptable quality, it would be called IPTV.

IPTV is a new technology that enables much more flexibility to manage contents and facilitates direct interaction with the sources of content, improving the feedback and future planning. The customer experience is greatly improved by allowing more control over the type of contents immediately available, as well as two-way communication with content providers.

A few years ago, another new technology shocked the entertainment industry – the infamous Napster enabled people to share music and movies in an unprecedented way. With

this technology it was not just the case of a neighbor lending a VHS tape with an old movie. With Napster, people shared prerelease albums and videos, creating significant losses for the music industry and movie studios.

Napster was eventually shut down in 2001, but several peer-to-peer (P2P) networks appeared and the phenomenon grew dramatically, reaching millions of users worldwide. Checking e-mule would confirm an average user base of 600–900 million users worldwide.

At the same time, several providers have started to offer legal downloads to the general public. Anyone can buy music and video files. The entertainment industry has added digital rights management (DRM) capabilities to the files and applications used to reproduce the contents, which enables a sustainable model for sales of digital content. Recently, some online stores have even removed DRM to calm the complaints from their subscribers related to fair use of the contents. Users feel that, once they have paid for content, they should be able to enjoy it on any device, and DRM is blocking that fair use possibility.

The recently born IPTV industry will need to address the same issues that once affected the digital media distributors. Customers tend to share information, and over the years there have been a number of very clever pieces of software that enable people to share information and content. A recent example of the phenomenon is Freenet, a reportedly headless network of nodes, storing encrypted sections of content and sending it to anyone who requests a particular piece of data. With Freenet it is very difficult to find who is sharing illegal material, and hence the enforcement of intellectual property rights and copyright restrictions becomes more difficult.

One of the main risks faced by the industry is the rise of thousands of ‘home-made stations’ willing to broadcast DRM-protected contents. One example of the technology that will come in the future is VideoLAN. This software enables multimedia streaming of MPEG-2, MPEG-4, DVDs, satellite and terrestrial TV on a high-bandwidth network broadcast or unicast. If Freenet and VideoLAN meet, then there will be thousands of encrypted stations broadcasting content outside any control of regulators.

However, the IPTV industry not only has DRM and content protection issues, customers are used to an always-on service with consistent quality. IPTV would have to maintain high levels of availability to convince subscribers that this is a viable option.

With a worldwide trend in privacy protection laws, all the information sent and received from the customer must be protected from third parties trying to capture information. The wireless LAN/WAN markets are a prime example that bad publicity happens to good people. IT managers are not purchasing the technology because of fear, uncertainty and doubt around the potential risks of deploying wireless networks.

Many problems that have affected the cable and satellite industry in the past will gradually migrate to the IPTV service providers, with the increased impact of IPTV providing a two-way communication that includes logical paths connecting TVs to the Internet, and with that environment come computer worms and viruses. IPTV service providers must ensure that subscribers are not able to attack the servers providing contents, and also protect subscribers from the Internet and other subscribers. Most importantly, the shared infrastructure with other services has to be protected.

All those risks and threats must be addressed to achieve a profitable business model. The following chapters of this book will cover some of the basic measures required to implement IPTV security.

Chapter 1 will cover an initial reference to threats to IPTV infrastructures, including known attacks and effects on the IPTV solution.