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**Distributed Video Systems**  
Chapter 6  
Issues in Video Transmission and Delivery  
Part 1 - Challenges and Opportunities

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## 5.1 Introduction

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- Challenges in Delivering Video Over Networks
  - ◆ Resource Allocation Problem
    - How to maximize network utilization?
  - ◆ Scheduling Problem
    - How to schedule transmission and playback to maintain good video playback qualities?
  - ◆ Engineering Problem
    - How to minimize buffer requirement, and response time?
    - How to correct packet errors and losses in the network?
- These are conflicting requirements!
  - ◆ It's a matter of tradeoff between *bandwidth*, *delay*, and *buffer*.

## 5.2 Low-Bit-Rate Video Applications

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- Video Compression Algorithms
  - ◆ H.261, MPEG-4, etc.
  - ◆ Bitrates from 8kbps to ~256kbps.
- Video Delivery Channels
  - ◆ Internet, ISDN, modem, LAN, etc.
- Major Applications
  - ◆ Video phone, video conferencing, Internet video-on-demand and video broadcast, etc.
- Key Challenges
  - ◆ Improving video coding efficiency and robustness to errors.
  - ◆ Adapting video service to changing network conditions.

### 5.3 Medium-Bit-Rate Video Applications

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- Video Compression Algorithms
  - ♦ AVI, QuickTime, MPEG-1, MPEG-2.
  - ♦ Bitrates from 512kbps to ~3Mbps.
- Video Delivery Channels
  - ♦ LAN, ATM, ADSL, Cable Modem, Satellite, etc.
- Major Applications
  - ♦ Video-on-demand, video broadcast, high-quality video conferencing, etc.
- Key Challenges
  - ♦ Improving video coding efficiency and compressed video quality.
  - ♦ Supporting large number of concurrent users: scalable video server, network technology and infrastructure, etc.

### 5.4 High-Bit-Rate Video Applications

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- Video Compression Algorithms
  - ♦ MPEG-2, MPEG-4.
  - ♦ Bitrates start from a few Mbps.
- Video Delivery Channels
  - ♦ LAN, ATM, Cable Modem, Satellite, etc.
- Major Applications
  - ♦ Video-on-demand, video broadcast, HDTV, etc.
- Key Challenges
  - ♦ Improving video coding efficiency and compressed video quality.
  - ♦ Supporting receivers having different processing capabilities.
  - ♦ Designing high-bandwidth servers and networks.