

Attributes of Application-Layer Protocols

- Statefulness: connectionless vs. connection-oriented
- Architecture: client-server vs. P2P vs. other
- Participants: 1-to-1 vs. 1-to-N vs. N-to-1
- Directionality: pull vs. push vs. both
- Pattern: one-way vs. two-way (symmetric)
- Duration: transaction-oriented vs session-oriented
- Data Volume: light vs. medium vs. heavy
- Transport-Layer Protocol: TCP vs. UDP vs. other
- Ports: static (well-known) vs. dynamic



Design Issues for Media Streaming Applications

- Type: live versus stored (on-demand)
- Paradigm: client-server vs. P2P vs. peer-assisted
- Bit rate: Constant (CBR) vs. Variable (VBR)
- Content: copyright vs. public domain vs. user-generated
- **Files:** one large file vs. many small(er) chunks
- Quality Levels: one vs. many (layering) vs adaptive
- Media: audio vs. video vs. both
- Format: .mpeg vs .jpeg vs .mp4 vs .mov vs .wav ...
- Resolution: HD vs SD; desktop vs mobile
- Advertising: before vs. after vs. none
- Application-Layer Protocol: HTTP vs. HTTPS vs. other
- Transport-Layer Protocol: UDP vs. TCP vs. other
- Delivery: unicast vs. multicast vs. broadcast; CDN or not