

CSC2209
Computer Networks

DCCP = Unreliable TCP

Stefan Saroiu
Computer Science
University of Toronto

Treat Your Advisor Like Your Grandparents!

Treat Your Advisor Like Your Grandparents!

- Advisors have very short attention spans
- They always forget what they said and to whom
- Every time you see them, spend time:
 - Introducing yourself
 - Telling them what you work on
 - Ignoring them telling the same story over and over again
 - Act surprised!
- Also, make sure you visit them at least once in awhile

Project Proposals

- Next deadline:
 - Friday, November 19th: project report
- Websites up by the end of the week
- Take this seriously!

- *Analyzing and Enhancing Content Availability in BitTorrent-like P2P.* Nadeem, Jin, Di.
- *Large-Scale Measurement of Bluetooth Activity.* Ivan, Alireza.
- *Non-Interfering VMs.* Tom.
- *Proxy Support for Application Replay.* Vladan.
- *Cooperative Browser Caches.* Robert.
- *Something related to Spoofing & Phishing.* Shvet.

- Waqas, Andrew, Fareha?!

Take-away Messages?

- Congestion Management

- DCCP

Take-away Messages?

- Congestion Management
 - Application-level API for congestion control

- DCCP
 - How to build an unreliable, congestion control protocol

What are the uses of DCCP?

What are the uses of DCCP?

- Need congestion control, but no reliability:
 - Streaming media, VoIP, games, video-conferencing
- What does YouTube use?

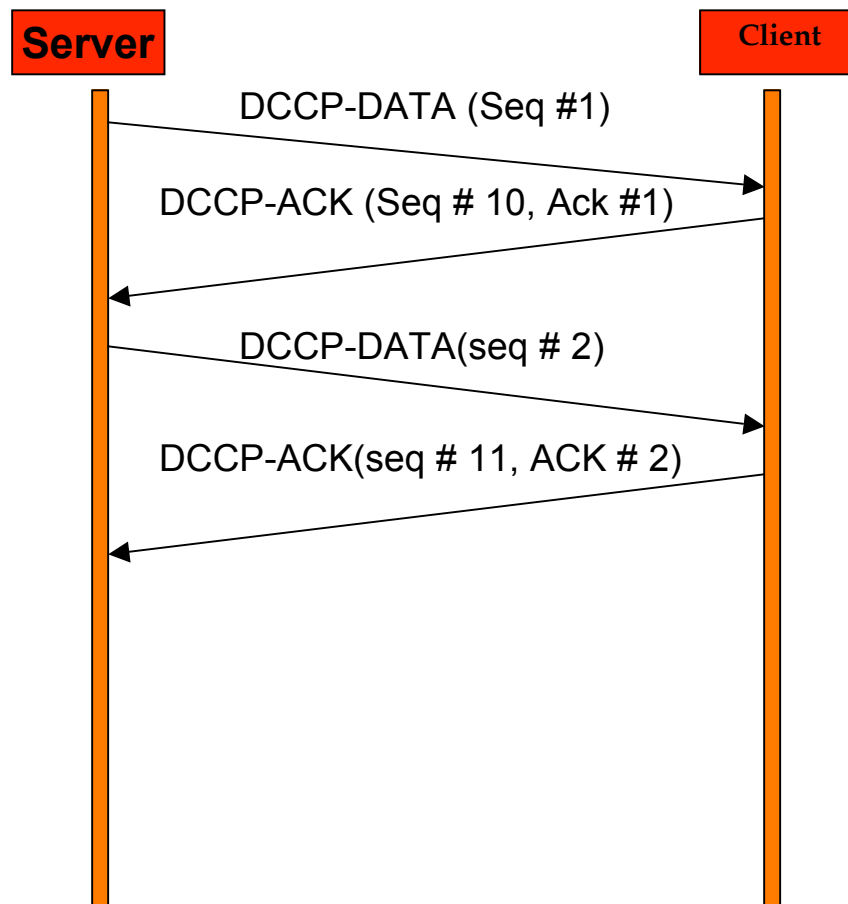
What are the uses of DCCP?

- Need congestion control, but no reliability:
 - Streaming media, VoIP, games, video-conferencing
- What does YouTube use?
 - Streaming media works just fine with TCP, unless it's live
- How much live content is there on the Internet?

What are the uses of DCCP?

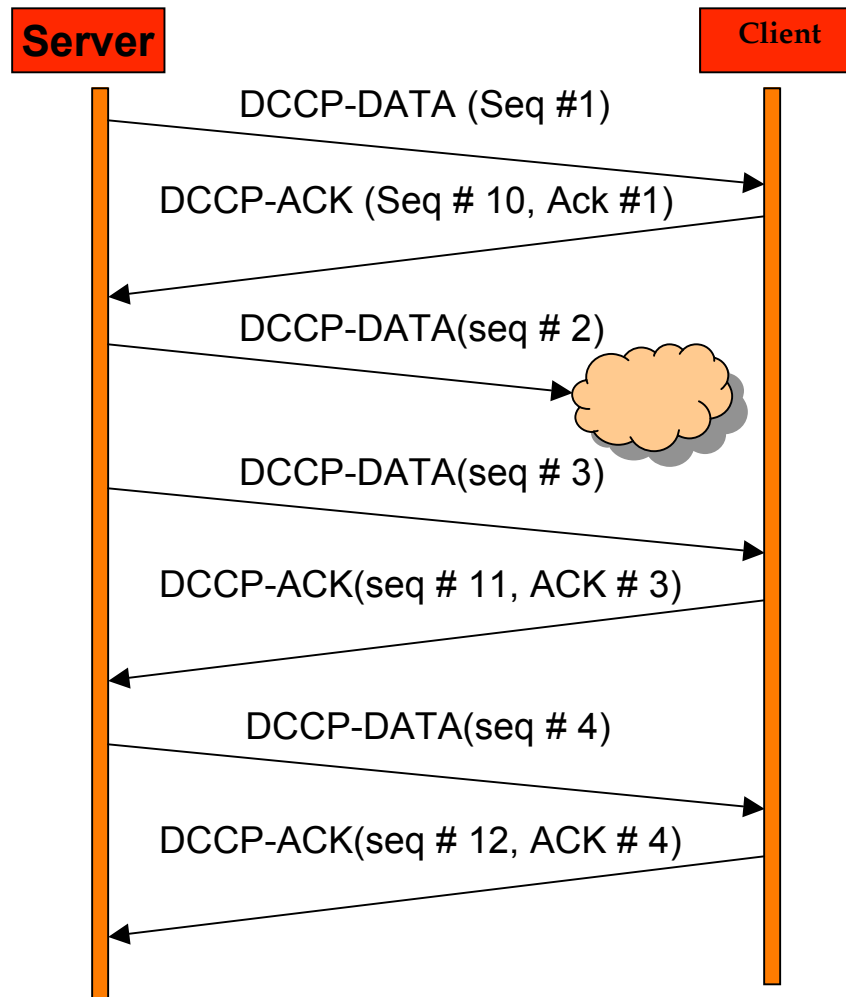
- Need congestion control, but no reliability:
 - Streaming media, VoIP, games, video-conferencing
- What does YouTube use?
 - Streaming media works just fine with TCP, unless it's live
- How much live content is there on the Internet?
 - Not much: is video-conferencing the only app?

DCCP Data Transfer Example



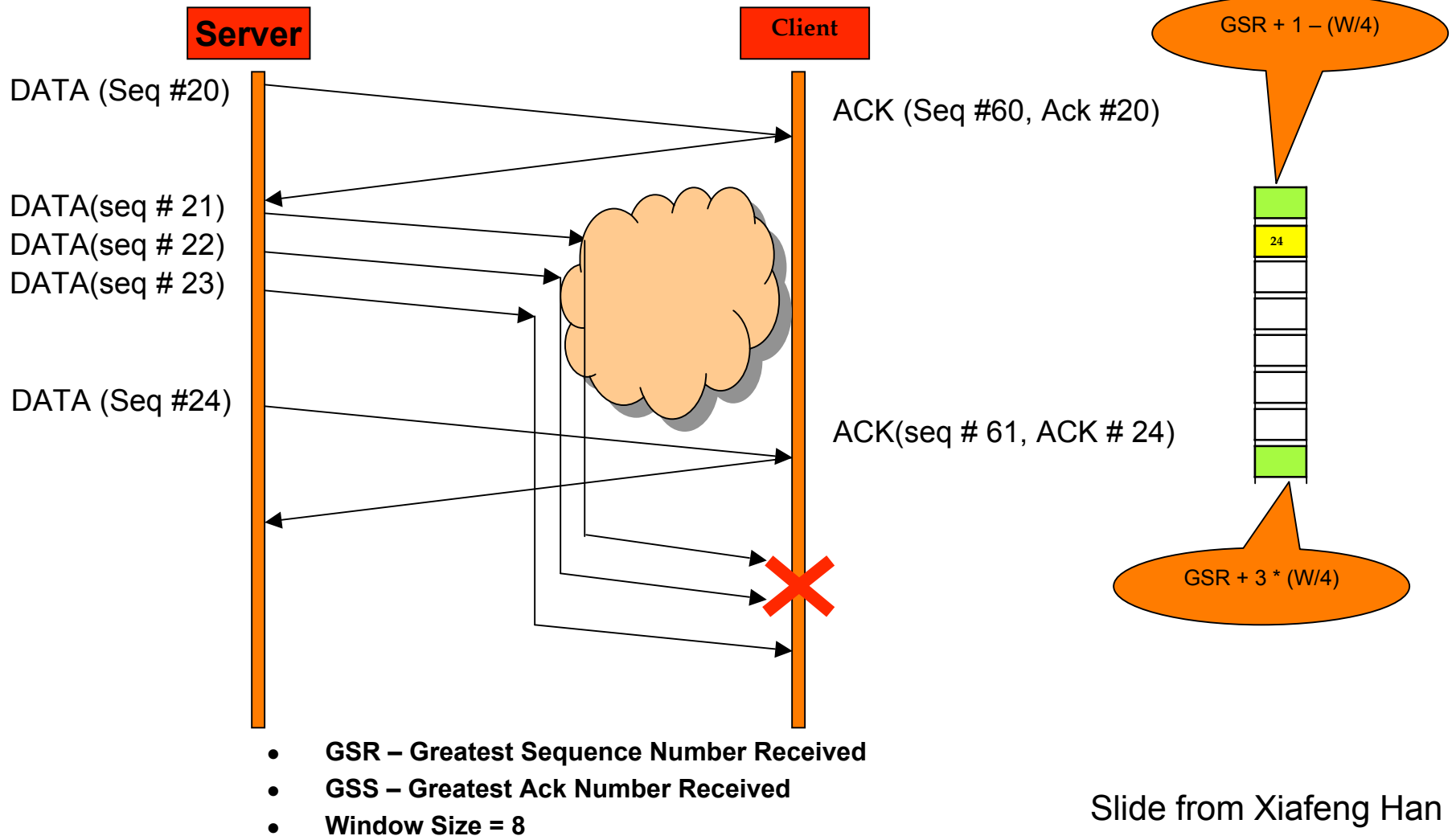
- Pure Seq #, not bytes
- Each packet carries a Seq #
- Seq # increase per packet
- Pure Acks also consume Seq #

DCCP Data Transfer Example



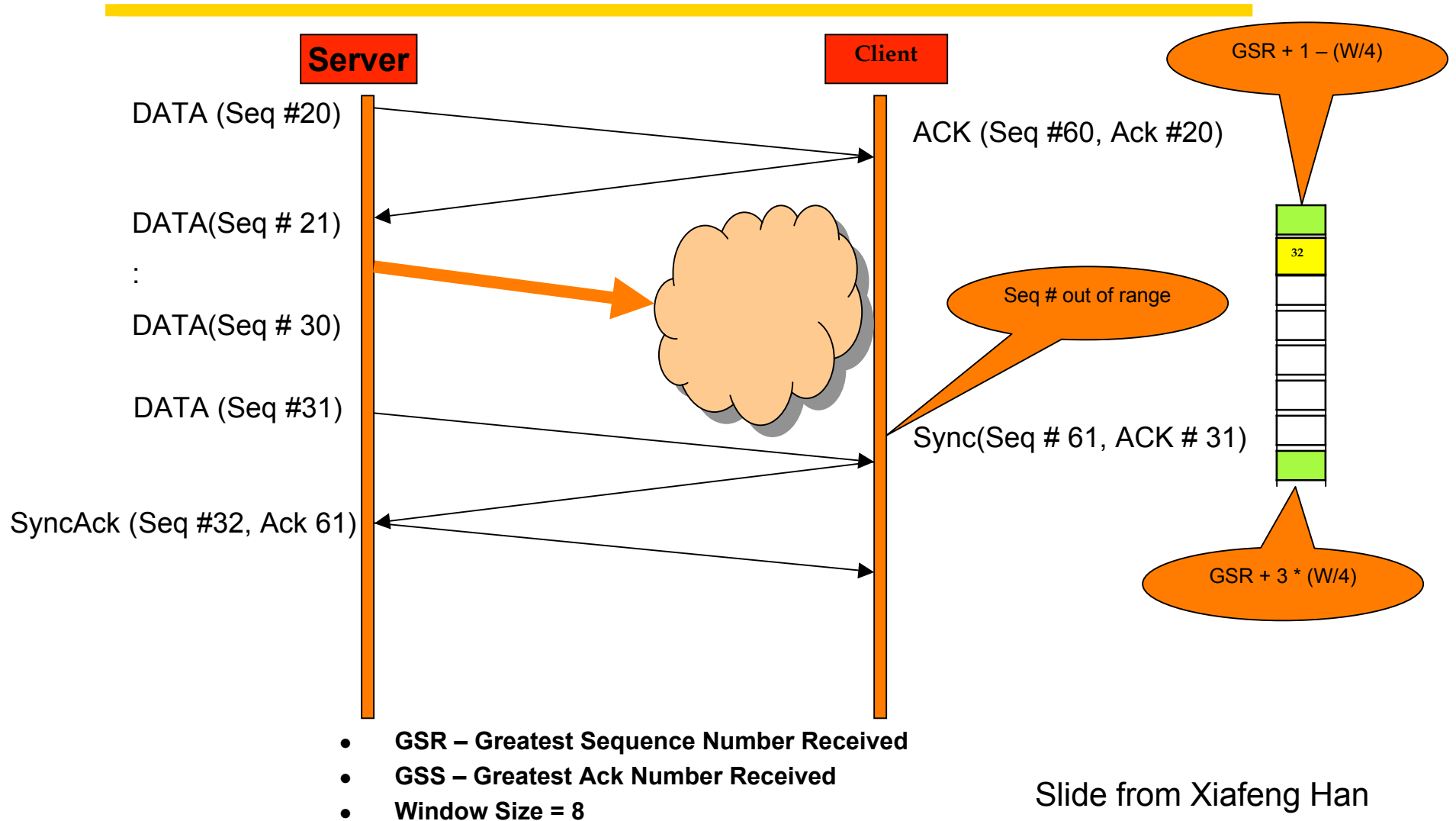
- No Retransmissions
- Acks the largest Seq # received

DCCP Data Transfer Example



Slide from Xiaofeng Han

DCCP Data Transfer Example



Slide from Xiaofeng Han

Two congestion control schemes

- CCID 2: TCP-like
 - Slow-start, timeouts like TCP
 - Additionally, congestion control for ACKs
- CCID 3: equation-based
 - Receiver measures loss rate and feeds back to sender
 - Sender uses feedback messages to estimate RTT
 - Loss rate and RTT are fed into equation
 - Sender adjusts actual rate to match expected rate
- When should one use CCID 2 vs. CCID 3?

Two congestion control schemes

- CCID 2: TCP-like
 - Slow-start, timeouts like TCP
 - Additionally, congestion control for ACKs
- CCID 3: equation-based
 - Receiver measures loss rate and feeds back to sender
 - Sender uses feedback messages to estimate RTT
 - Loss rate and RTT are fed into equation
 - Sender adjusts actual rate to match expected rate
- When should one use CCID 2 vs. CCID 3?
 - Whenever reacting to congestion must be abrupt
 - How about CBR vs. online games?
 - Many unknown, poorly-understood issues are left

Adding Reliability Back

- How would you add reliability to DCCP?

Adding Reliability Back

- How would you add reliability to DCCP?
 - FEC
 - Bloom filters
 - Likely very different than TCP...
- How about in-order delivery?

Congestion Manager Original Motivation

Congestion Manager Original Motivation

1. Many short Web Xfers
 2. Web accelerators
 3. Application heterogeneity: many apps over UDP to avoid TCP's reliability mechanism
- Are any of these motivations valid today?

Congestion Manager Current Motivation

Congestion Manager Current Motivation

- Congestion is located at the end-points today
 - CM manages flows to different destinations but sharing same bottleneck
- Should we expose API to applications?