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Additional Topics Q2 2002

VNC is a protocol for remote access to graphical user interfaces

Describe the VNC architecture [6]

Indicate what steps are taken to minimise network traffic [5]

How does the protocol adapt to networks and clients of different speeds [5]

Discuss how suitable VNC might be for use in 3rd generation mobile telephony (3G) systems [4]

VNC is a so-called thin client (or stateless client)
VNC works at the frame buffer level
Applies to all operating systems, windowing systems, and applications
Applies to any device with a communications link
A single graphics primitive is used
This primitive puts a rectangle of pixel data at a given x, y position
Keyboard and mouse events are sent from the client to the server
Connections are set up by the server requiring authentication from the client
Desktop size, pixel format, encoding are agreed
The client requests a full screen update, and off we go

Network traffic is minimised by using a variety of encodings
Left to right scan line order is the simplest encoding
Copy rectangle encoding is used when the client already has the pixel data in its frame buffer
Another (RRE) encoding describes rectangle differences from a single background colour rectangle
JPEG and MPEG can be used
Pixel data caching can be used at client to handle patterns such as text

Adaptive update is used for clients of different speeds
The server can choose the best encoding for the client and network speed
Update is client-driven (ie suck)
All screen changes since last update are coalesced into a single update
So the slower the client the slower the update
Each of N clients connected to a server can be of different speeds

Probably not very suitable because 3G networks will not be very reliable nor fast
However with VNC data is only sent if something changes
3G handset screens are small so data volume may be low
VNC handles changes in network bandwidth well
So it may end up working quite well