

Ideas to Simplify a Remote Xserver Environment

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Outline

- v **Introduction**
 - **History**
 - **The Problem**
- v **Case Studies**
 - **Citrix**
 - **Exceed**
 - **VNC**
 - v **Some additional VNC topics**
- v **Conclusion**
 - **A recommendation!**

History

- v **Our Environment**
 - **Resources**
 - v **20+ HP-UX and 5+ Sun Solaris systems**
 - v **Gigabit backbone**
 - v **100Mb to the desktop**
 - **Related infrastructure**
 - v **Samba for network file access**
 - v **Netapps for centralized home/project data**
 - v **Replicated MGC and other EDA/MDA software trees**
 - **APL at a glance**
 - v **365 acre campus**
 - v **We support 100+ users**
 - v **Multiple buildings**
 - **We support EDA and MDA applications**
 - **Most applications run on UNIX systems**
 - **Most users have a PC on their desk**

History (cont)

v The Demise of UNIX?

“The reports of my death are greatly exaggerated.”

Allegedly from the text of a cable sent by Mark Twain from London to the press in the United States after his obituary had been mistakenly published.

History (cont)

- v **The Demise of UNIX?**
 - **UNIX is still the preferred environment for many Electronic Design Automation tools**
 - v **Dependability**
 - v **Scalability**
 - v **Performance**
- v **The Bedfellows: IT & Microsoft**
 - **IT has embraced the PC**
 - v **Office productivity tools**
 - v **Back-room services**
 - v **Low entry cost**
 - v **Perceived low total cost**

The Problem

- ✓ **How to supply both sets of capabilities?**
 - **Simple and quick solution: Both a UNIX and a PC system on a desk**
 - ✓ **Expensive**
 - ✓ **Difficult to support**
 - ✓ **Still have interface problems**
- ✓ **Need to combine the two**
 - **IT champions single desktop system mantra**
 - **Engineering only wants to pay for one desktop system**

Case Studies: Intro

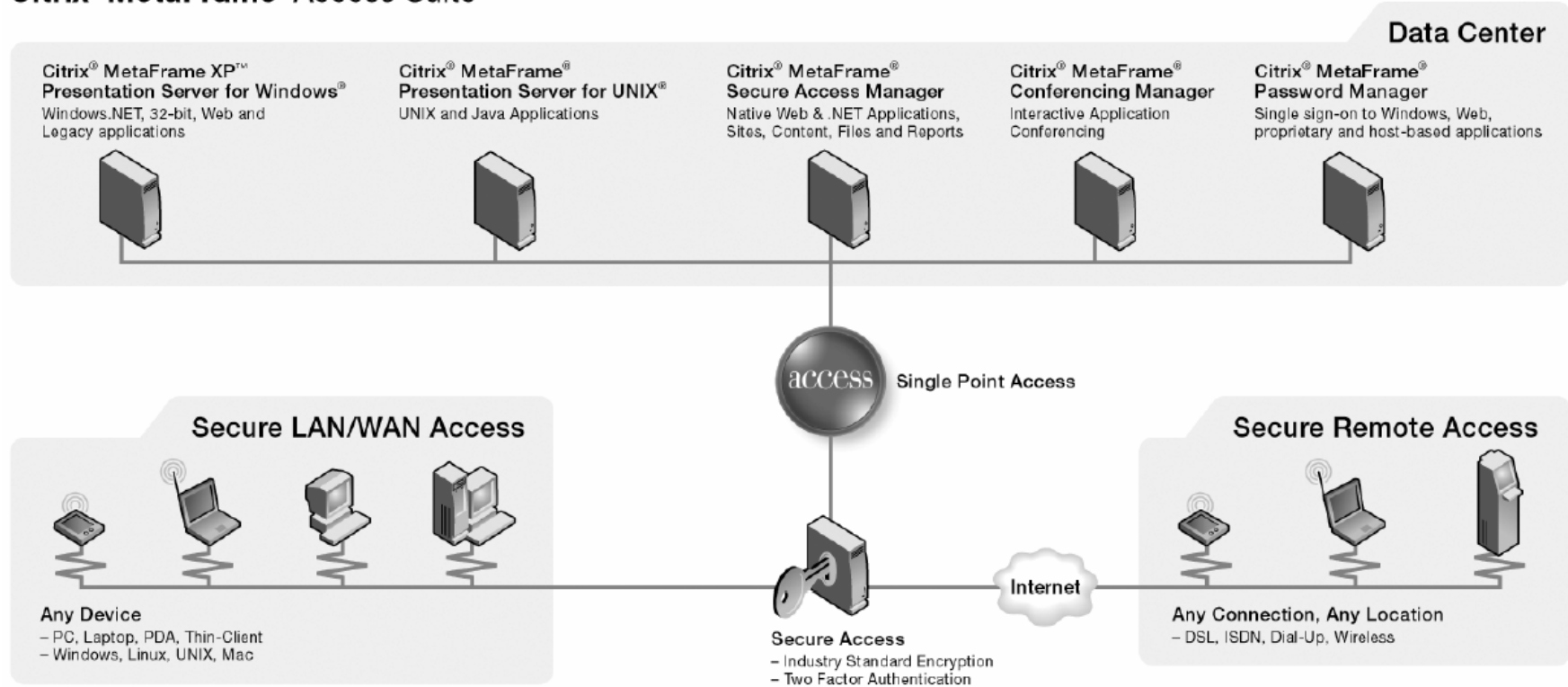
- v **Put PC capabilities within UNIX environment**
 - **Case study:**
 - v Citrix (WinCenter)
- v **Put UNIX capabilities within PC environment**
 - **Case Studies:**
 - v Exceed
 - v VNC
- v **Questions for the future**
 - **Will all EDA tools move to the PC?**
 - **Can Linux bridge the gap?**

Case Study: Citrix MetaFrame

- ✓ **Put the PC on the UNIX workstation**
 - **Thin client on UNIX system accesses remote PC server**
 - **IT creates/supports Citrix server**
 - **User sees a window within the UNIX environment**
 - ✓ **Looks like a PC**
 - ✓ **Does most things a PC can do**
 - ✓ **Server could handle 10-20 simultaneous users**
 - **From a UNIX user perspective, little changes**
 - ✓ **New window with PC capabilities**

Case Study Citrix MetaFrame (cont)

Citrix® MetaFrame® Access Suite



Case Study: Citrix MetaFrame: Analysis

- v **Server Issues**
 - IT didn't like Citrix servers
 - v Were different from other PC servers
 - v Citrix-specific attributes required specialized knowledge
- v **Interoperability Issues**
 - Cut-n-paste between platforms
 - v Text worked well; graphics didn't
 - v E-mail attachments
- v **Peripheral Issues**
 - The Citrix A: drive isn't the floppy drive in front of the user
 - A peripheral needed by a user must be installed on the server

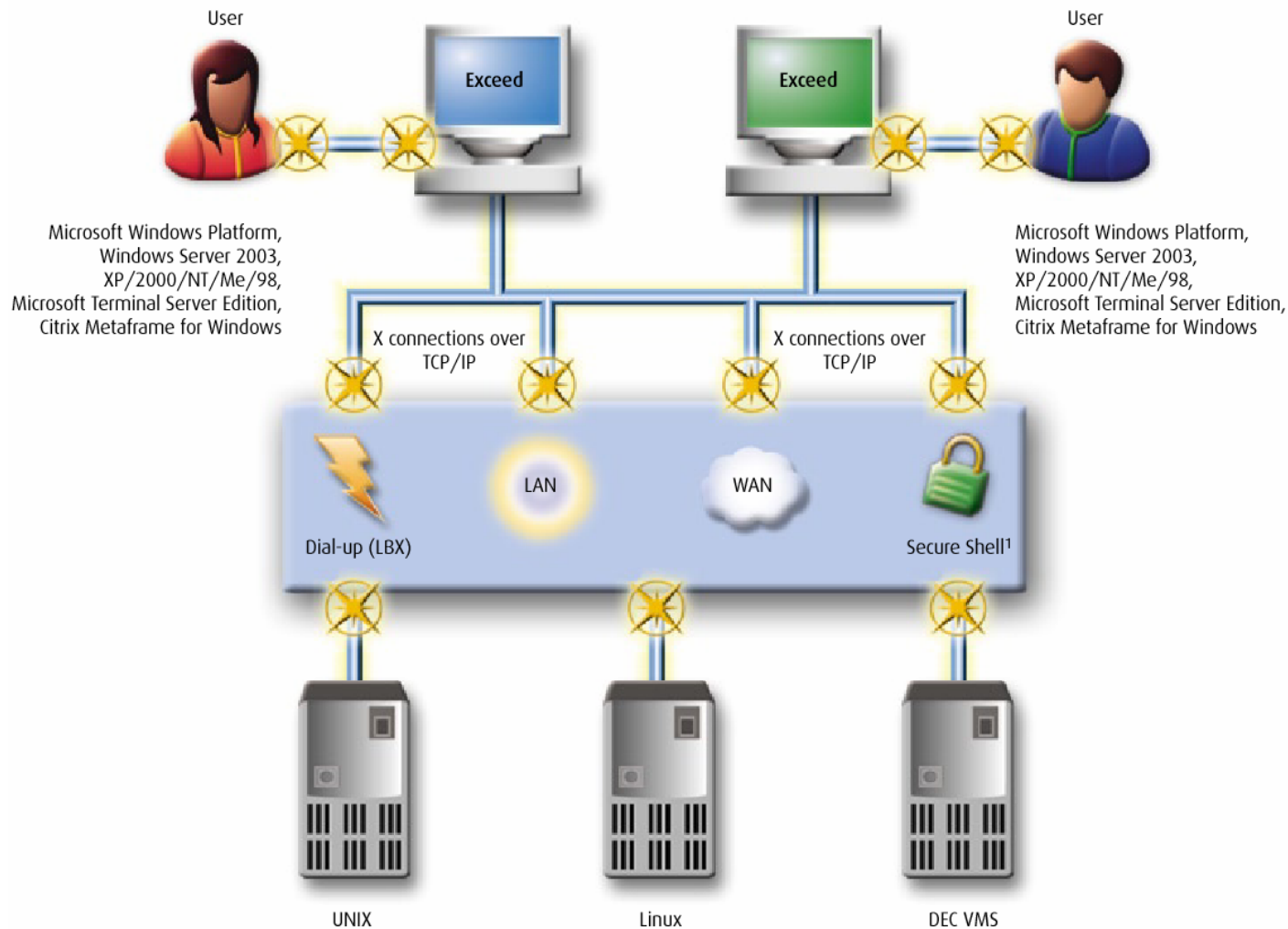
Case Study: Citrix MetaFrame: **Analysis** (cont)

- v **File System Issues**
 - PC file system integration worked well; UNIX file system integration needs attention
- v **Application Issues**
 - Limited to applications installed on server
 - Users unable to install their own applications
- v **Final Analysis**
 - Was a good transition mechanism
 - Didn't scale well
 - Too many limitations to develop enterprise-wide
- v **Caveat**
 - Our experiences were based on the particular configuration we tested (mid-late 1990s)
 - Some limitations we saw may be addressed in later revisions or competitive products

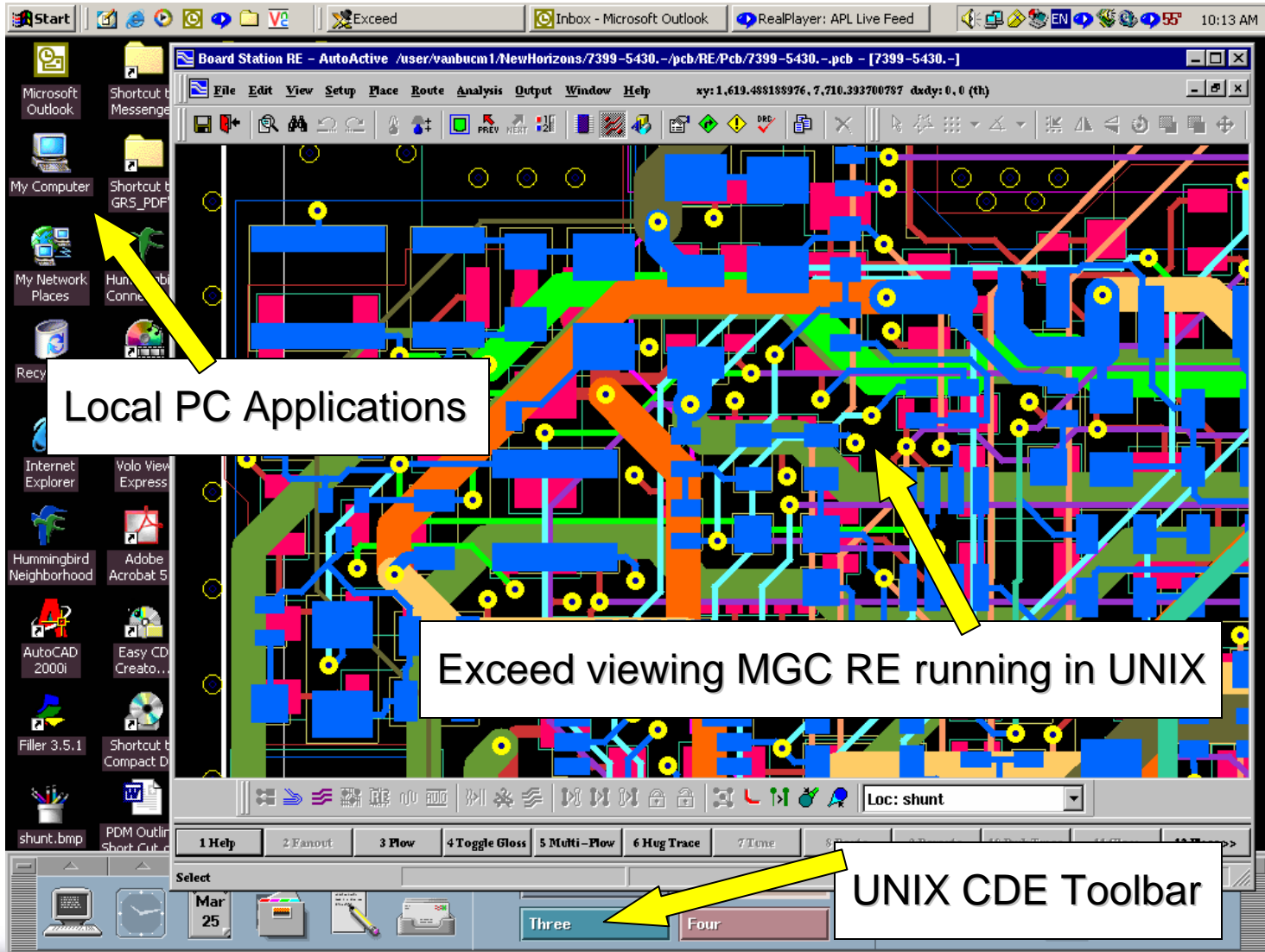
Case Study: Hummingbird Exceed

- ✓ **Access UNIX workstation from PC**
 - Exceed emulates Xserver on PC
 - User sees UNIX environment from PC
 - From a PC user perspective, little changes
 - ✓ New window with UNIX capabilities
 - **Highly configurable**
 - ✓ Managing configurations can be a challenge

Case Study: Hummingbird Exceed



Hummingbird Exceed Case Study: What the User Sees



Hummingbird Exceed Case Study: **Fonts**

- v **Xwindows and Fonts**
 - **Xservers need to know what fonts to display**
 - **Many applications use specialized fonts**
 - v **Icons in Mentor Graphics applications**
- v **Different ways to distribute fonts**
 - **Store locally on user's PC**
 - v **Fonts get stale quickly as applications change**
 - v **Must be updated on each system**
 - **Central font server**
 - v **Each Exceed installation points to the font server**
 - v **Fonts need to be kept up to date on server, but all users see updates immediately**

Hummingbird Exceed Case Study: Configuration

- ✓ **Hundreds of configuration options**
 - Initial effort to understand choices
 - Settled on modifying font and communications areas only
- ✓ **Fonts**
 - `$MGC_HOME/bin/mgc_font_collect`
 - `$MGC_HOME/bin/mgc_font_convert`
 - **Storage location**
 - ✓ Local in Exceed font database
 - ✓ Remote in UNIX font server
 - Originally modified Exceed font configuration; later discovered this isn't necessary
 - **Communications (XDMC Broadcast mode)**
 - ✓ Provides user list of UNIX systems
 - ✓ Modify single Exceed form and related text file (optional)

Hummingbird Exceed Case Study: **Analysis**

- ✓ **PC users keep full PC functionality**
- ✓ **Bandwidth Issues**
 - **Network is key to performance**
 - **Heavy graphics increase network load**
 - ✓ **Particularly 3D images**
- ✓ **Cost Issues**
 - **All Exceed users must be licensed**
 - ✓ **Administrative costs for installation, configuration and technical support**
- ✓ **Simplified configuration - Communications mode only**
- ✓ **Font serving is painless - Limited to UNIX effort**

Case Study: VNC

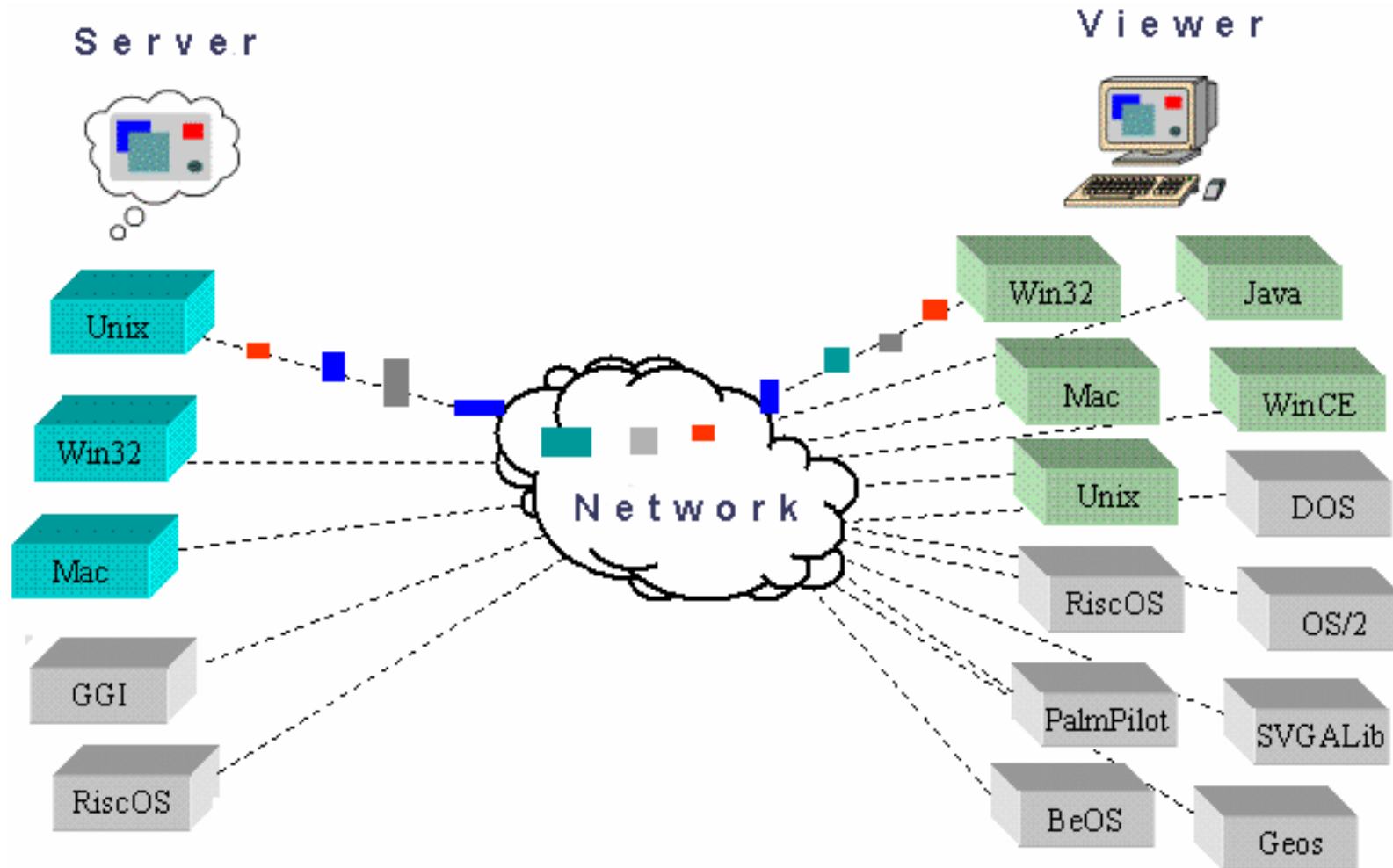
- √ **Virtual Network Computing (VNC)**
 - **Open source**
 - **Originally developed by AT&T Labs – Cambridge**
 - **Now supported by RealVNC, a UK company**
 - √ **Still supply free version**
 - **Available from other vendors**
 - √ **Generally, basic executables supplied free**
 - √ **Additional products and services available for fee**

Case Study: VNC

v How VNC Works

- **Traditional Xwindows client/server relationship:**
 - v “Xclient” – runs on remote system (“server”)
 - v “Xserver” – run on local system (in front of user)
- **VNC uses a server/viewer methodology:**
 - v VNC server – runs on remote system
 - v VNC viewer – runs on local system
- **What does this mean?**
 - v All font issues handled on server system
 - v PC doesn’t need to be able to see fonts
 - v PC only requires small (250K) viewer
 - v No configuration required on PC!

Case Study: VNC

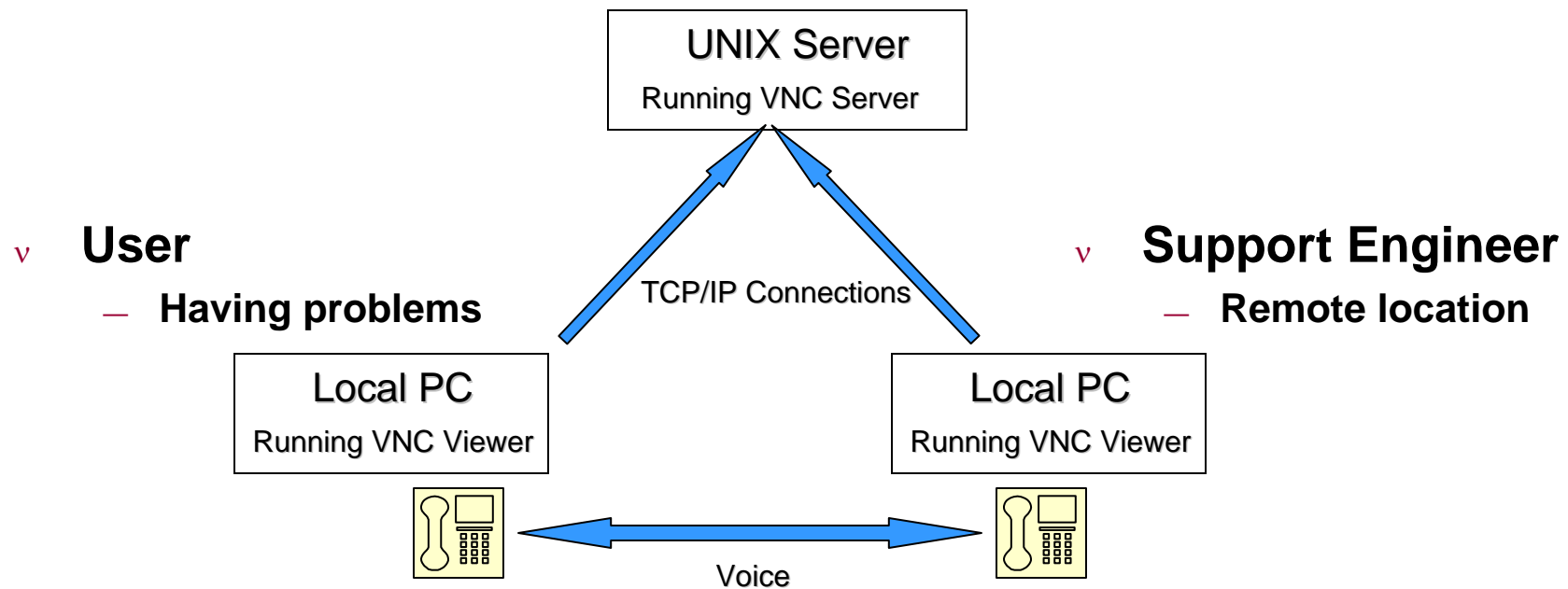


Case Study: VNC

- ✓ **Two ways we use VNC**
- ✓ **What we call “Traditional VNC”**
 - **User session works like this:**
 - ✓ **Telnet to UNIX system from PC**
 - ✓ **Start VNC server (and note assigned display number)**
 - ✓ **Start VNC viewer on PC (supply display number)**
 - ✓ **Do UNIX work**
 - **Some users disliked separate telnet step to start server**
 - **This approach supports multiple viewers**
 - ✓ **Powerful remote support capability**
 - **This approach supports session re-attachment**
 - ✓ **If a PC crashes, UNIX work is unaffected**

Case Study: VNC

- v **VNC Highlight: Multiple viewer sessions**
 - Requires “share” mode enabled



v **User**

- Having problems

v **Support Engineer**

- Remote location

- v **Both keyboards and mice active simultaneously**
- v **Both see the same UNIX session**
- v **This model could work for MGC support!**
 - You and MGC support talking and looking together

Case Study: VNC

- ✓ **Two ways we use VNC (cont)**
- ✓ **What we call “Easy VNC”**
 - **User session works like this:**
 - ✓ **Start VNC viewer on PC (only supplying remote system name)**
 - ✓ **CDE login screen appears**
 - ✓ **Do UNIX work**
 - **More intuitive and convenient**
 - ✓ **Particularly for new users**
 - **This approach doesn’t support multiple viewers or session re-attachment**
 - ✓ **No VNC password**

Case Study: VNC

v Additions to /etc/inetd.conf

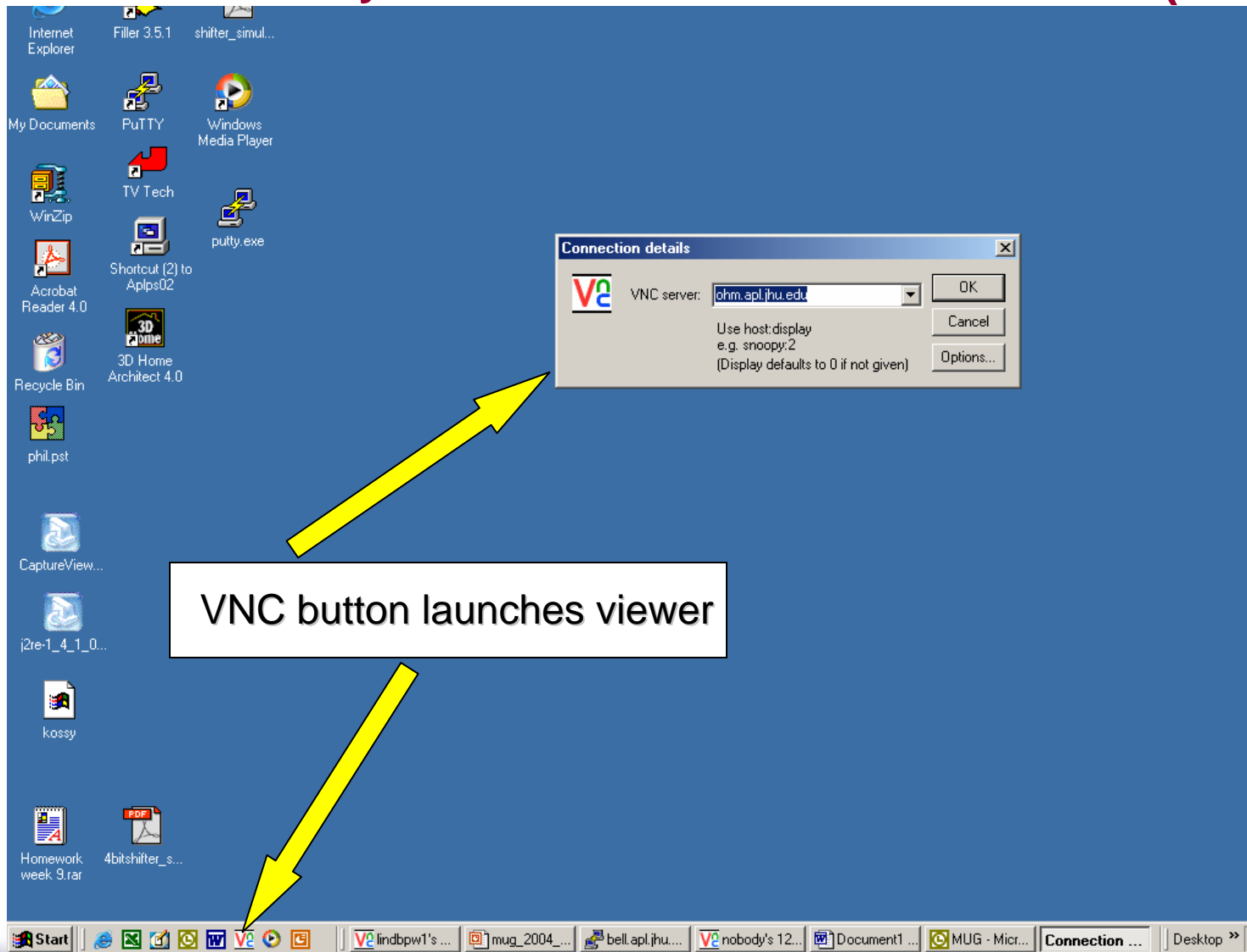
```
# START_VNC
# Xvnc option:
# -inetd : run from inetd
# -once : Terminate server after one session
# -depth 24 : color depth is 24 ( default is 8)
# -query localhost : Connect to local host
# -geometry : display size
# -IdleTimeout 432000 (time out after 7 days)
# -broadcast : broadcast ( Whatever system responds first)
# securitytypes=none
#
# Ports 5900-5904
vnc-1240x940 stream tcp nowait nobody /usr/local/bin/Xvnc Xvnc -inetd -once -query localhost -IdleTimeout 432000 -
desktop 1240x940 -geometry 1240x940 -depth 24 securitytypes=none
vnc-1240x860 stream tcp nowait nobody /usr/local/bin/Xvnc Xvnc -inetd -once -query localhost -IdleTimeout 432000 -
desktop 1240x860 -geometry 1240x860 -depth 24 securitytypes=none
vnc-1152x864 stream tcp nowait nobody /usr/local/bin/Xvnc Xvnc -inetd -once -query localhost -IdleTimeout 432000 -
desktop 1152x864 -geometry 1152x864 -depth 24 securitytypes=none
vnc-1024x768 stream tcp nowait nobody /usr/local/bin/Xvnc Xvnc -inetd -once -query localhost -IdleTimeout 432000 -
desktop 1024x768 -geometry 1024x768 -depth 24 securitytypes=none
vnc-800x600 stream tcp nowait nobody /usr/local/bin/Xvnc Xvnc -inetd -once -query localhost -IdleTimeout 432000 -
desktop 800x600 -geometry 800x600 -depth 24 securitytypes=none
```

Case Study: VNC

v Additions to /etc/services

```
penguin/user/lindbpw1(2)% ypcat services | grep -i vnc  
vnc-1240x860 5901/tcp # 1240x860 localhost  
vnc-1024x768 5903/tcp # 1024x768 localhost  
vnc-1152x864 5902/tcp # 1152x864 localhost  
vnc-800x600 5904/tcp # 800x600 localhost  
vnc-1240x940 5900/tcp # 1240x940 localhost
```

VNC Case Study: What the User Sees (EasyVNC)



VNC button launches viewer

VNC Case Study: What the User Sees (cont)

The screenshot displays a VNC session with two main areas of interest:

- Remote Desktop (UNIX Applications):** A window titled "DESIGN MANAGER" is open, showing a circuit schematic for "Schematic#1 5301-7200.1 sheet8". The schematic includes components like a 74AC14 inverter, a 74AC244 buffer, and two 6N140A optoisolators. A yellow arrow points from the text "UNIX Applications viewed in VNC" to the schematic window.
- Local PC (Local PC Applications):** The desktop environment of the local PC is visible on the left. A yellow arrow points from the text "Local PC Applications" to the desktop icons, including "Calendar", "Recycle Bin", and "Deleted Items".

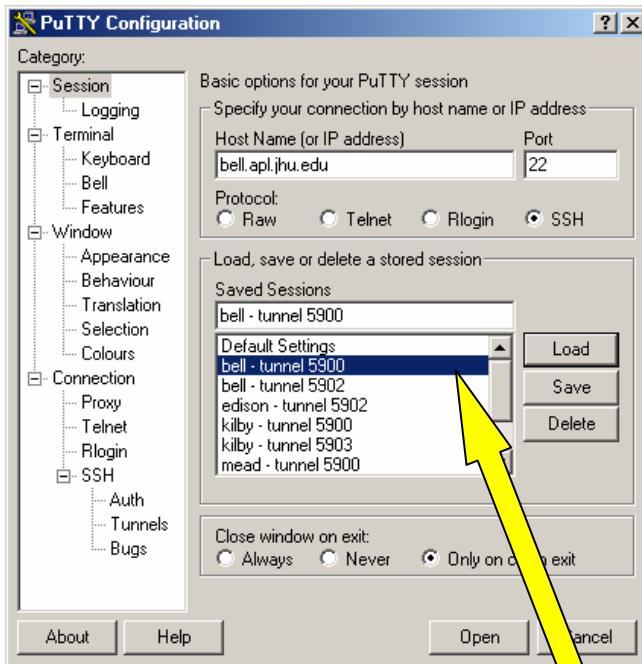
At the bottom of the VNC window, a toolbar contains various function keys (F4-F11) with labels such as "LMS Place Part", "Set Grid Snap", and "View Area". The taskbar at the very bottom shows the Start button, several open applications, and the system tray with the time 9:55 AM.

VNC: Additional Topic

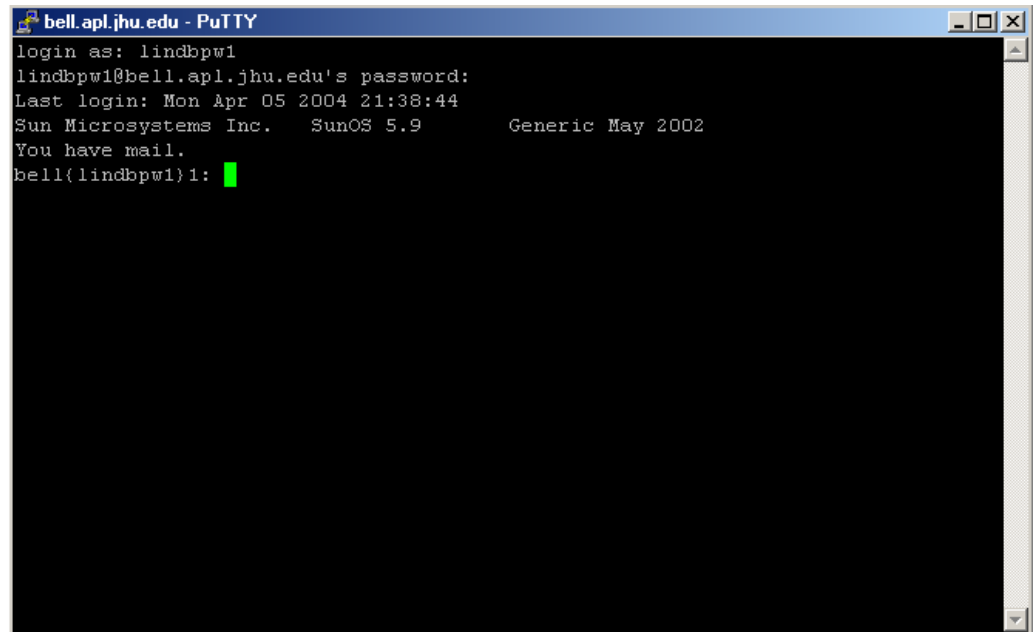
- ✓ **VNC can be used through a firewall using Secure Shell (SSH)**
 - **SSH can be used to create a tunnel**
 - ✓ **Our favorite SSH implementation is PuTTY**
 - **VNC can be opened through the tunnel instead of directly to the server**
 - **We have used this capability to allow students to access systems behind a firewall for class work**

VNC: Additional Topic (cont)

v Use PuTTY to start an SSH tunnel



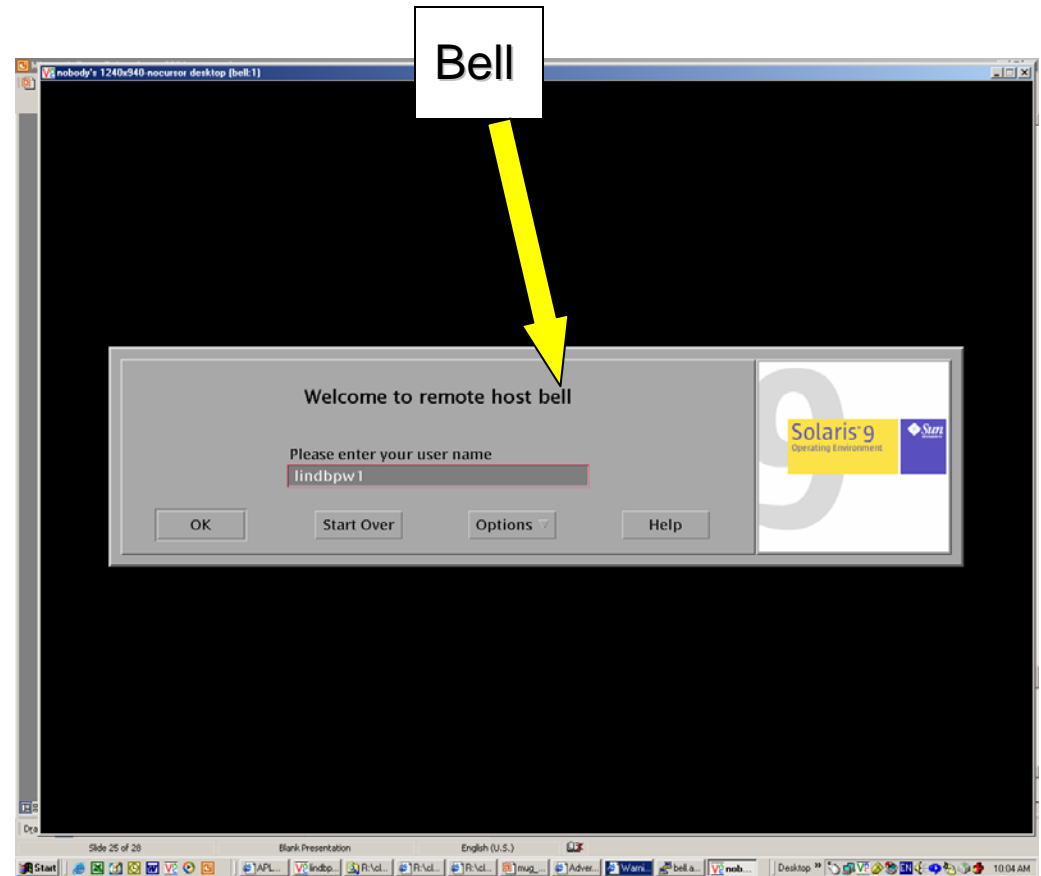
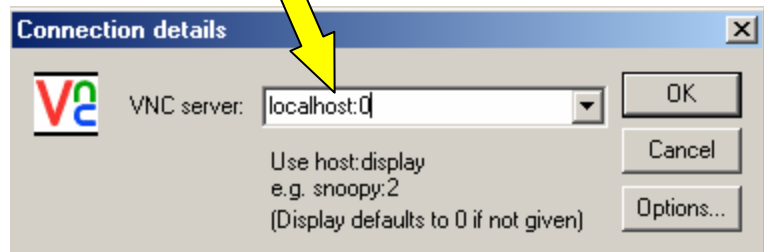
Bell



VNC: Additional Topic

v VNC viewer

Notice: Not Bell



Lessons Learned

- ✓ **PC key repeat can't be controlled per key**
 - **Affects MGC Function keys when held down**
- ✓ **Board Station graphic performance was not satisfactory during initial implementation**
 - **Issue has been addressed by software revision and configuration**
- ✓ **Open source offered best overall solution**
 - **Lowest total cost of ownership**

VNC – The Future

- ✓ **Customize VNC launcher**
 - Simplify choosing display size
 - Or maybe choose another VNC-compatible viewer
- ✓ **Support “broadcast” mode**
 - Automatically assign UNIX system from pool of available machines (i.e., Load Sharing Facility LSF)

Conclusion

- v **Several choices available**
 - Choose what works best for your site
- v **VNC is a valuable resource**
 - Flexible
 - Has allowed us to maximize our UNIX investment
 - VNC 4.0 improvements
- v **Observations and Comments**
 - What is happening with HP-UX?
 - What is happening with Itanium?
 - Still watching Linux
 - v No hurry yet
 - Other generic viewers are available
 - v We are always testing and evaluating new products
 - v Have been impressed with KDE's Remote Desktop Connection
 - Additional handouts available

Acknowledgement

- v **Steve Gelsie JHU/APL**
 - **UNIX administration; implemented all of the ideas we had**

