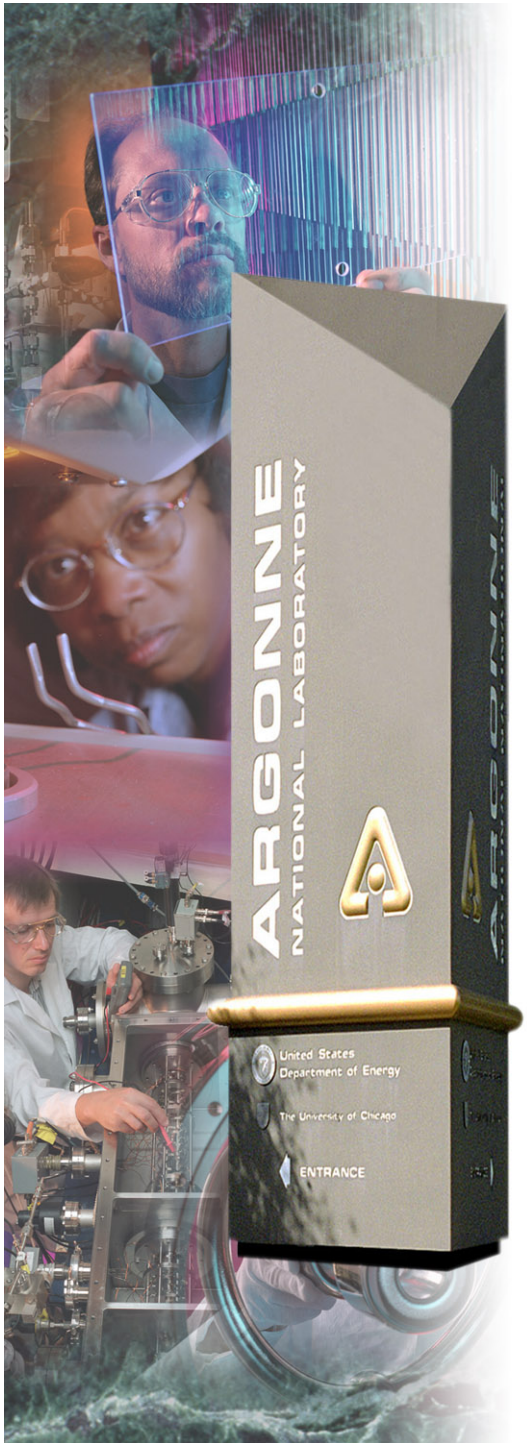


Remote Access

Kenneth Evans, Jr.

February 22, 2005

Part of the EPICS "Getting Started" Lecture Series

Argonne National Laboratory

Office of Science
U.S. Department of Energy

A U.S. Department of Energy
Office of Science Laboratory
Operated by The University of Chicago

Outline

- VPN
- Citrix and other Terminal Servers
- Tarantella
- VNC
- Access Grid

- Wireless

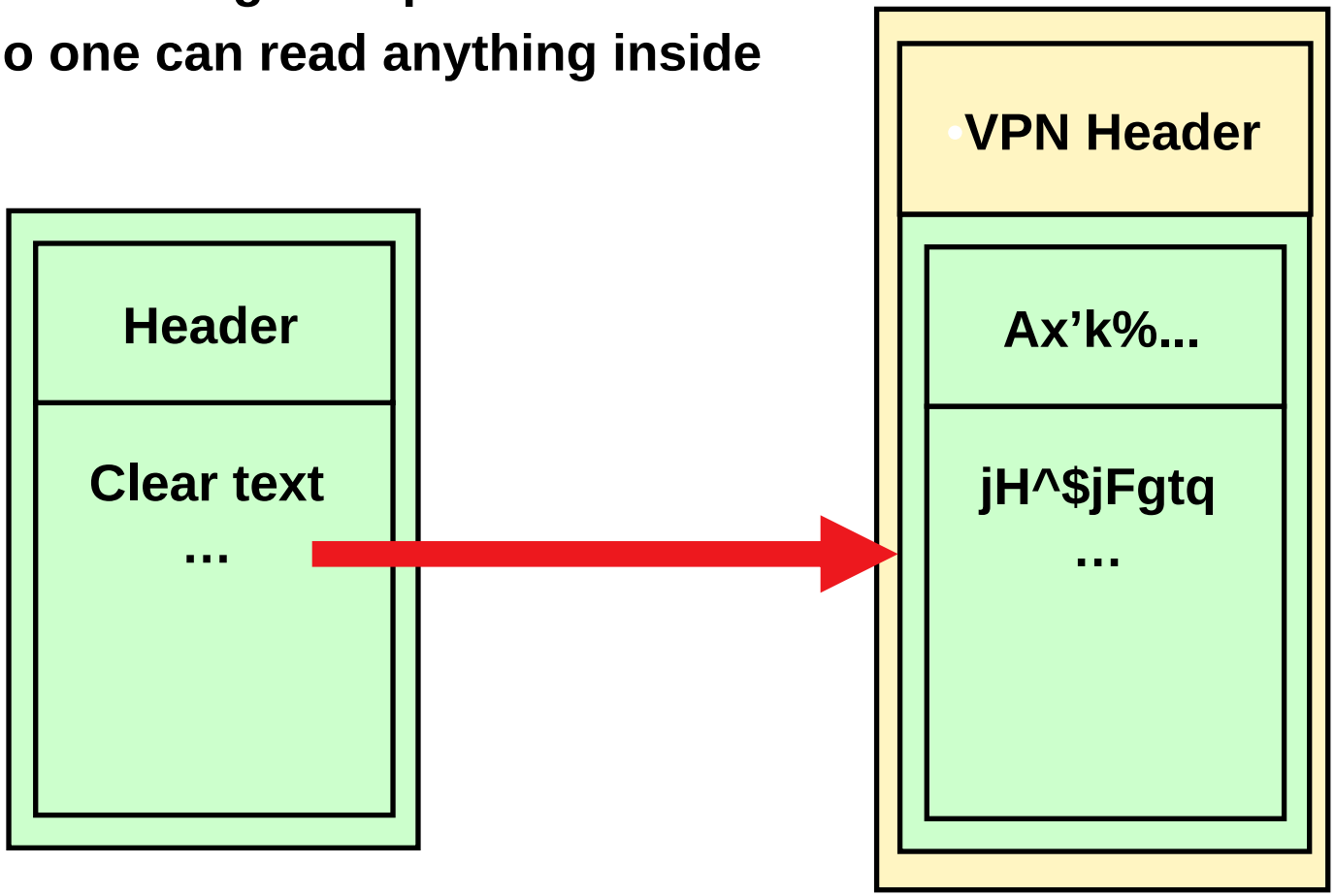
- EPICS on Windows

VPN

- **Stands for Virtual Private Network**
- **A private network built on a public network (i.e. the Internet)**
- **Uses encryption**
  - Encryption excludes hosts from outside the private network seeing your data
  - Even if they are on the public network
- **Uses access control and authentication with secure protocols**
  - IPSEC is the security layer standard
  - Type “man ipsec” if you want to know more (You probably don’t)
- **Less expensive than dedicated lines**
- **Sometimes referred to as “tunneling”**

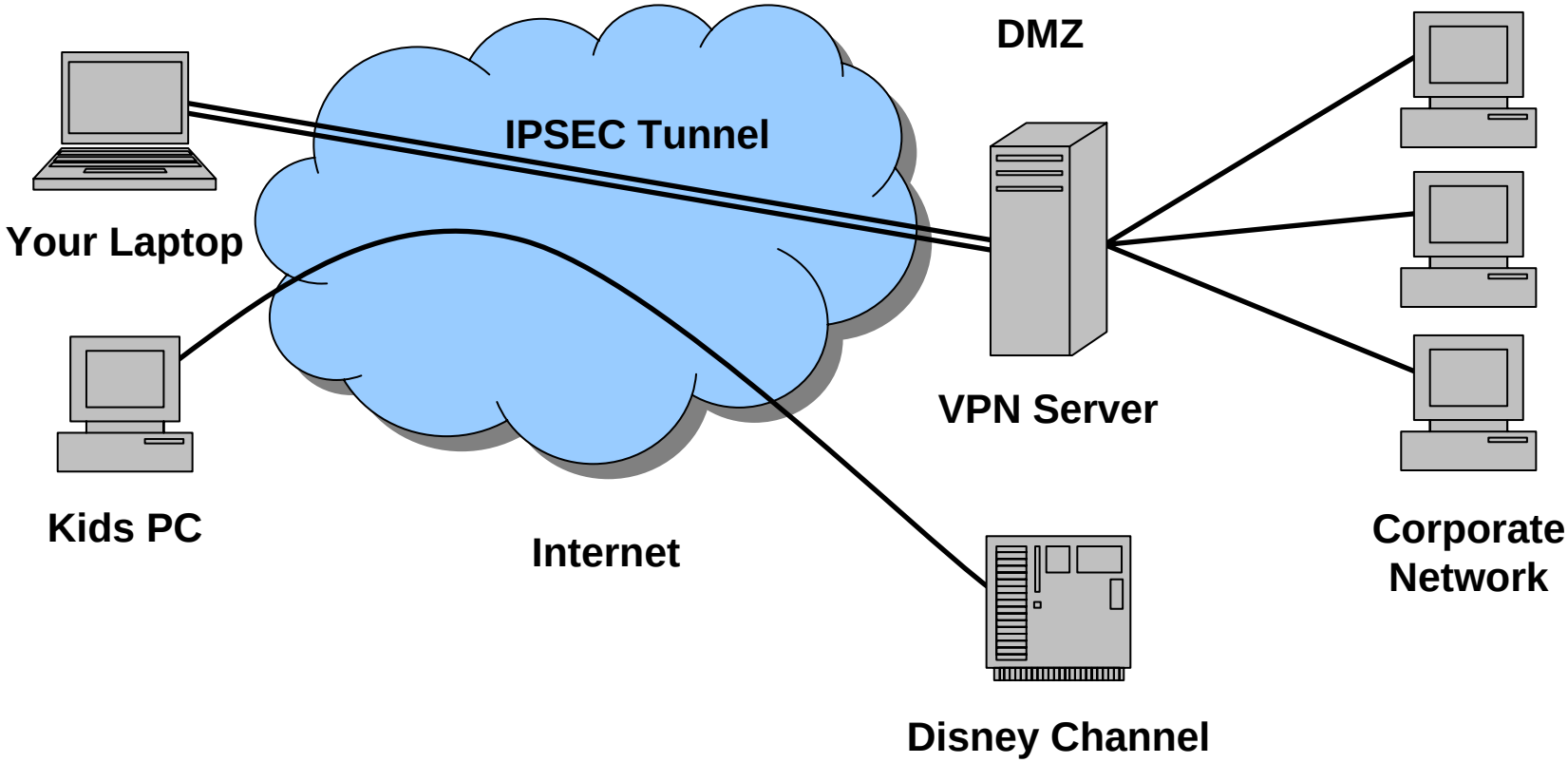
VPN: Simple View

- IP packets get encrypted and put inside a wrapper packet that goes through the public Internet
- No one can read anything inside



VPN: Broader View

- You run a client on your computer that connects to a VPN server that lets you connect to the internal network
- Other Internet traffic goes as usual



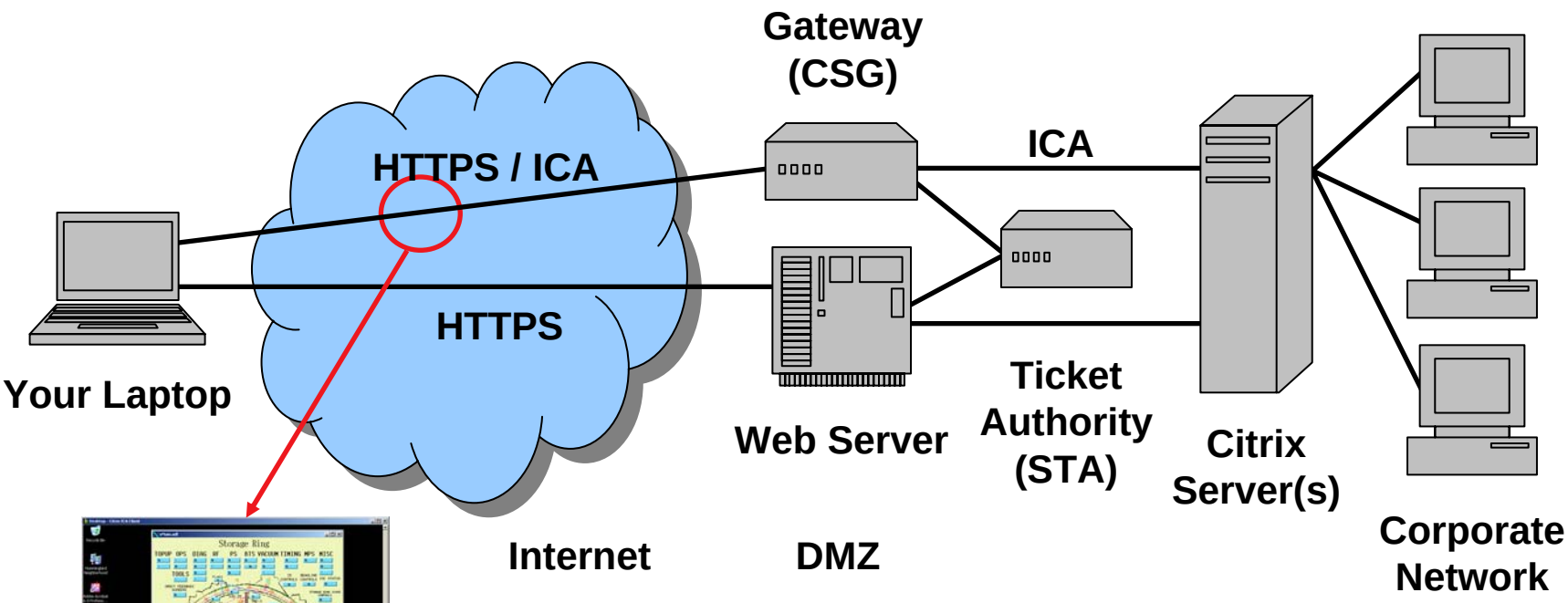
How to use a VPN

- **Talk to your System Administrator**
  - He or she will tell you what to do
- **Typically you need to install client software on your computer**
  - And run it to make the VPN connection
- **The System Administrator needs to allow you access**
- **Will be similar to being connected internally**
  - You can see the internal APS web pages, for example
  - You can't view adult sites
- **You will probably be on a different subnet from your work computer**
  - The networks you see may (or may not) be limited
- **It should work from any place where you have Internet access**
- **It is not a secure as some other means**
  - You can transmit viruses into the system

Citrix and Terminal Servers

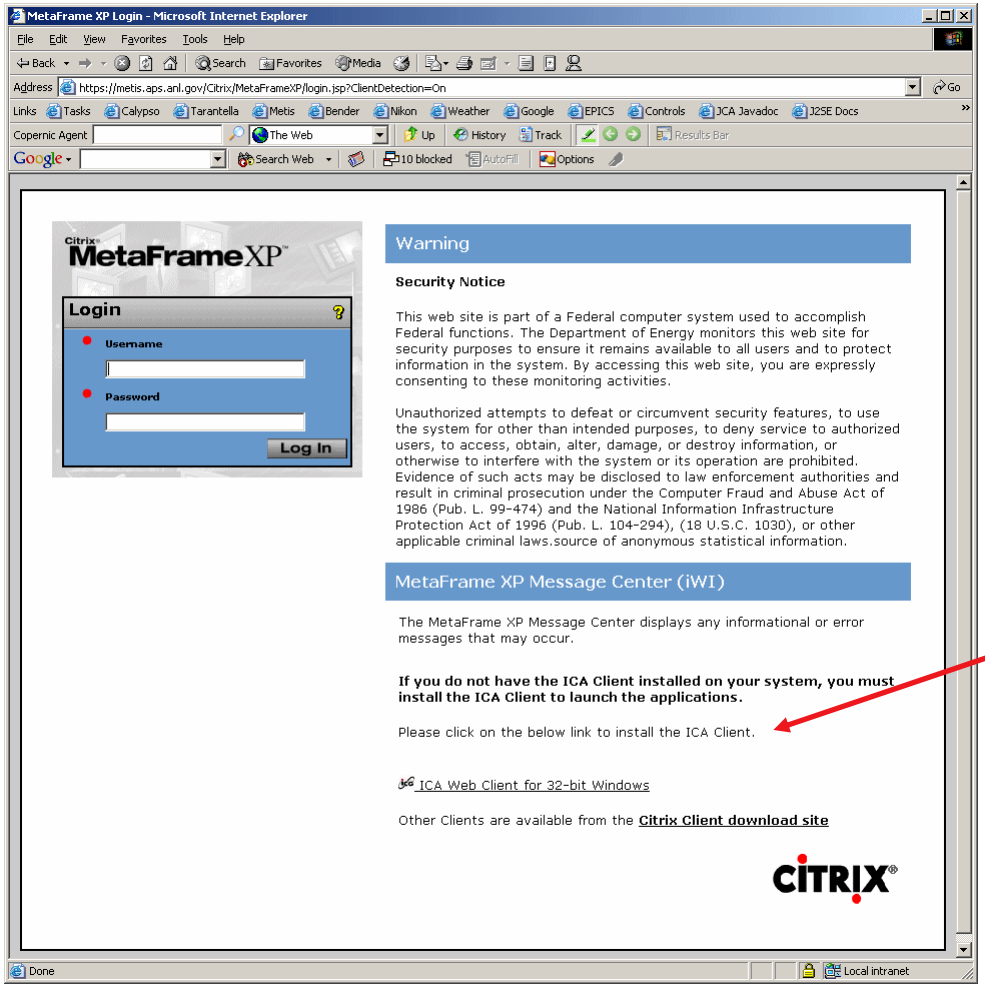
- **A means of accessing the corporate network from almost anywhere**
  - Your mother's computer (if she has administrator privileges)
- **You may need to download a client**
  - Clients are available for most platforms, even PDAs
- **You access a web page and enter a password**
- **This allows you on an internal Windows machine**
  - With access to standard applications
  - Or your own full Windows desktop
- **At the APS the desktop has Exceed and EPICS installed**
  - You can run EPICS applications, such as MEDM
  - You can connect to other computers via Exceed's Xstart
- **Your applications are running on the internal computer**
  - You cannot transmit viruses

Citrix



Desktop runs on the server, displays on Your Laptop, communicates via ICA (Intelligent Console Architecture)

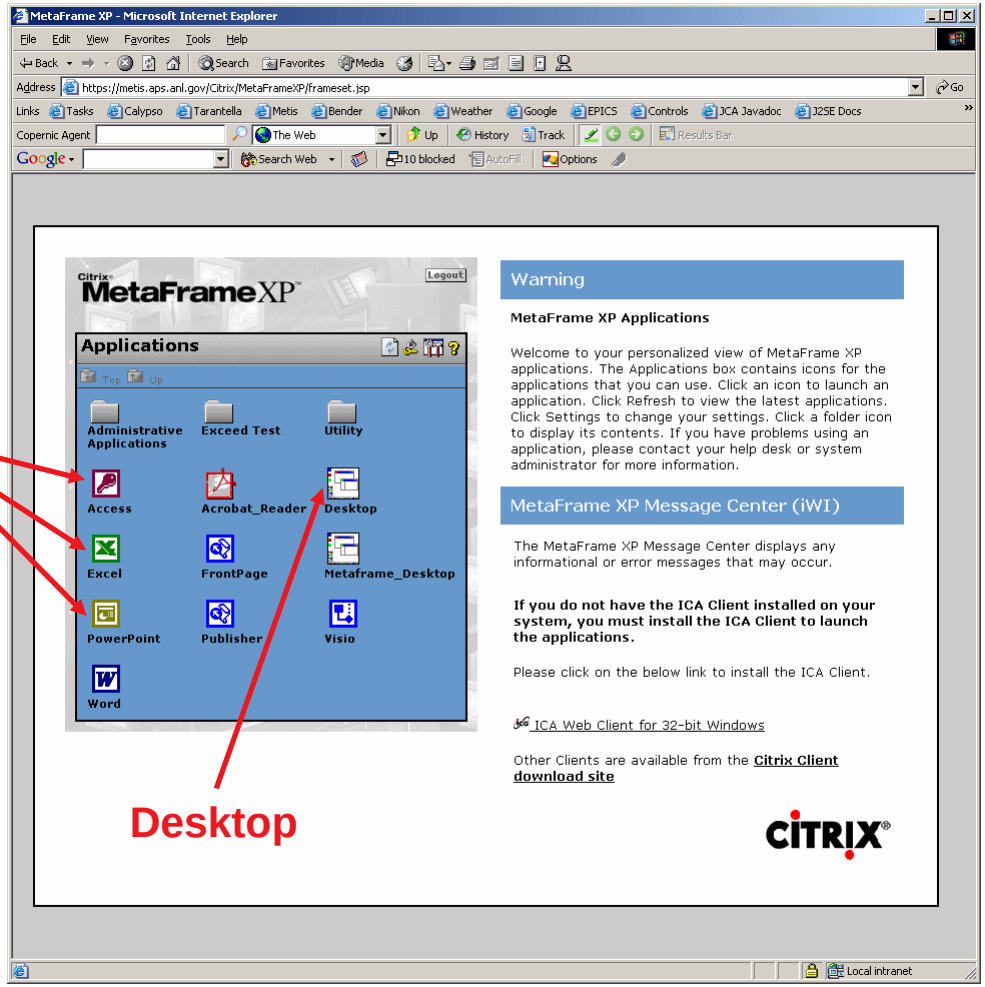
Citrix Login Screen



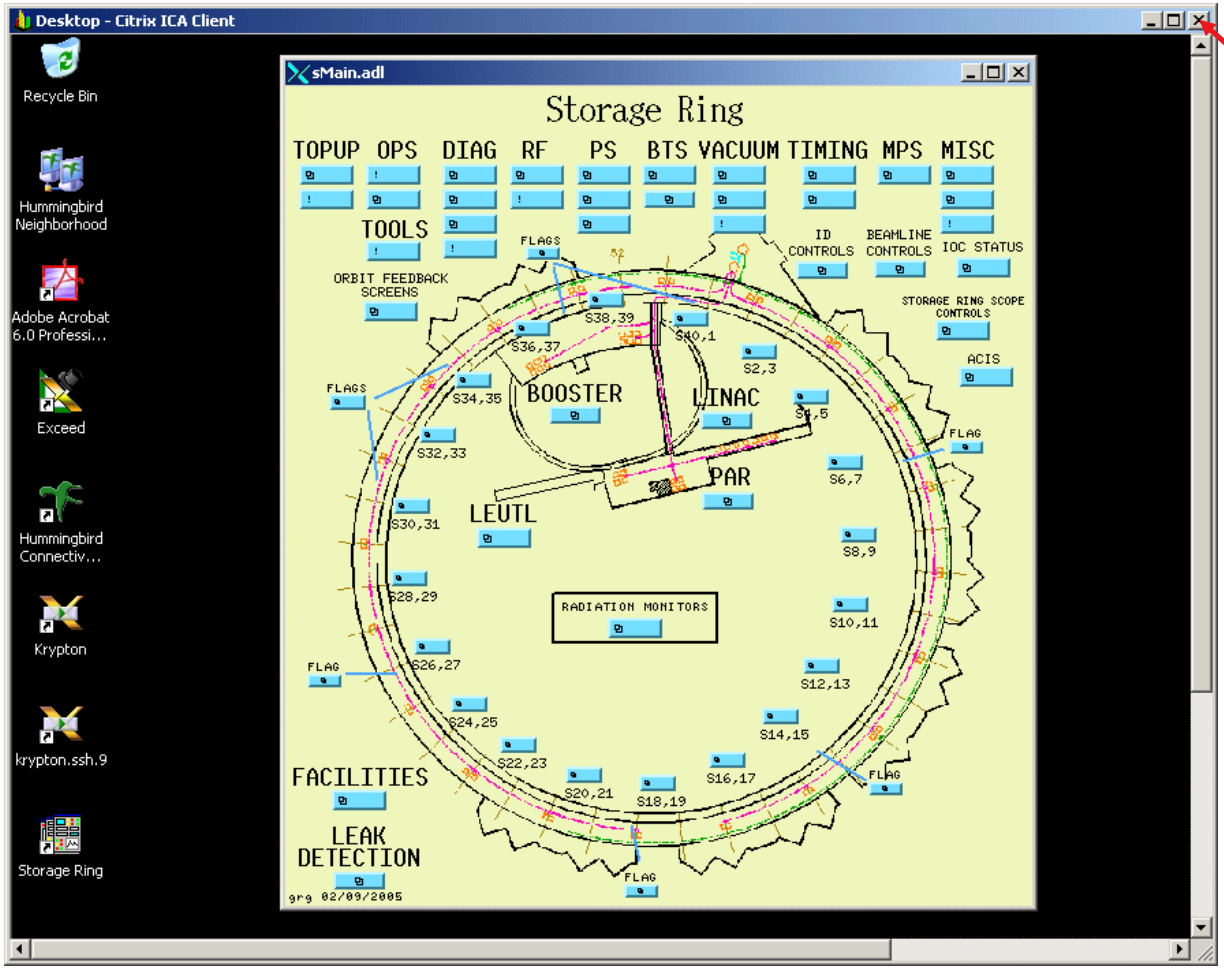
Download Windows Client

(Solaris clients are already installed)

Citrix Internal Screen



Citrix Desktop



Don't click here

XConfig .xs file Shortcut For Remote Login

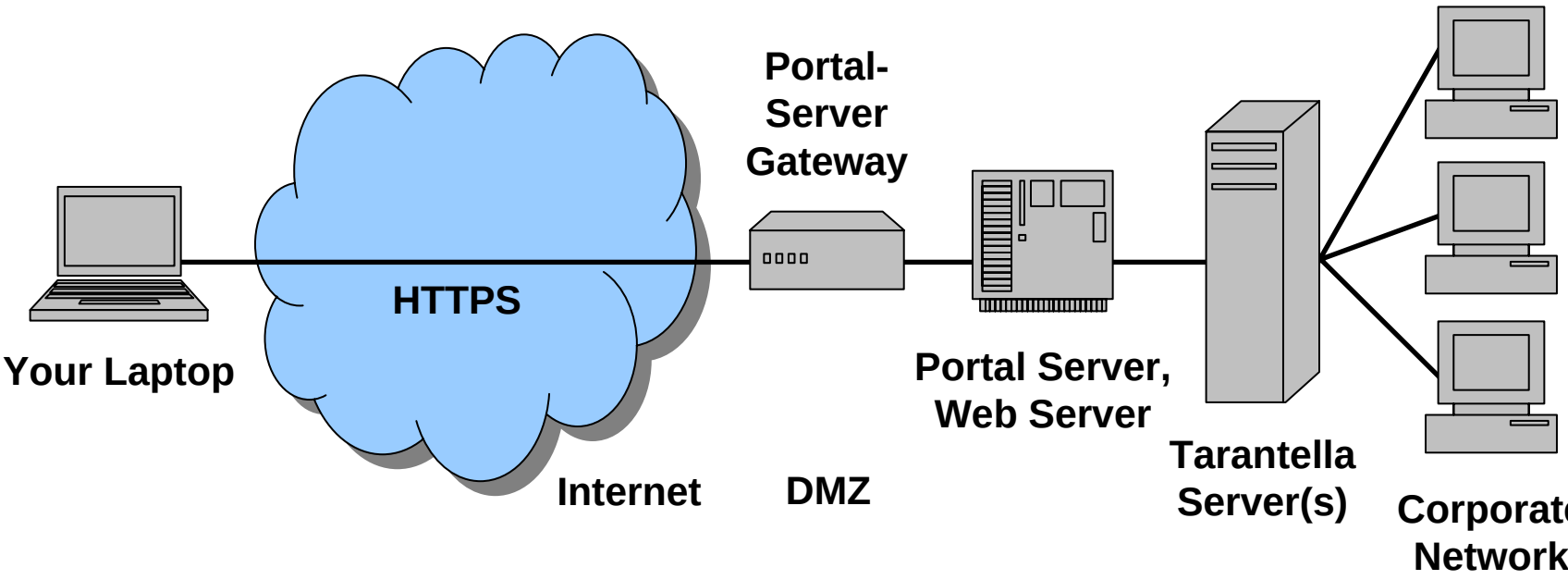
Storage-Ring Shortcut

- **Close desktop by Log Off, not Shut Down**

Tarantella

- **Similar to Citrix except that it connects to UNIX and uses X Windows as well as Microsoft Windows**
- **Is a Portlet (Java) running on a Portal Server**
- **You access a web page and enter a password**
- **You do not need to download a client**
  - You use a browser
  - But there are native clients available
- **Your applications are running on the internal computer**
  - You cannot transmit viruses

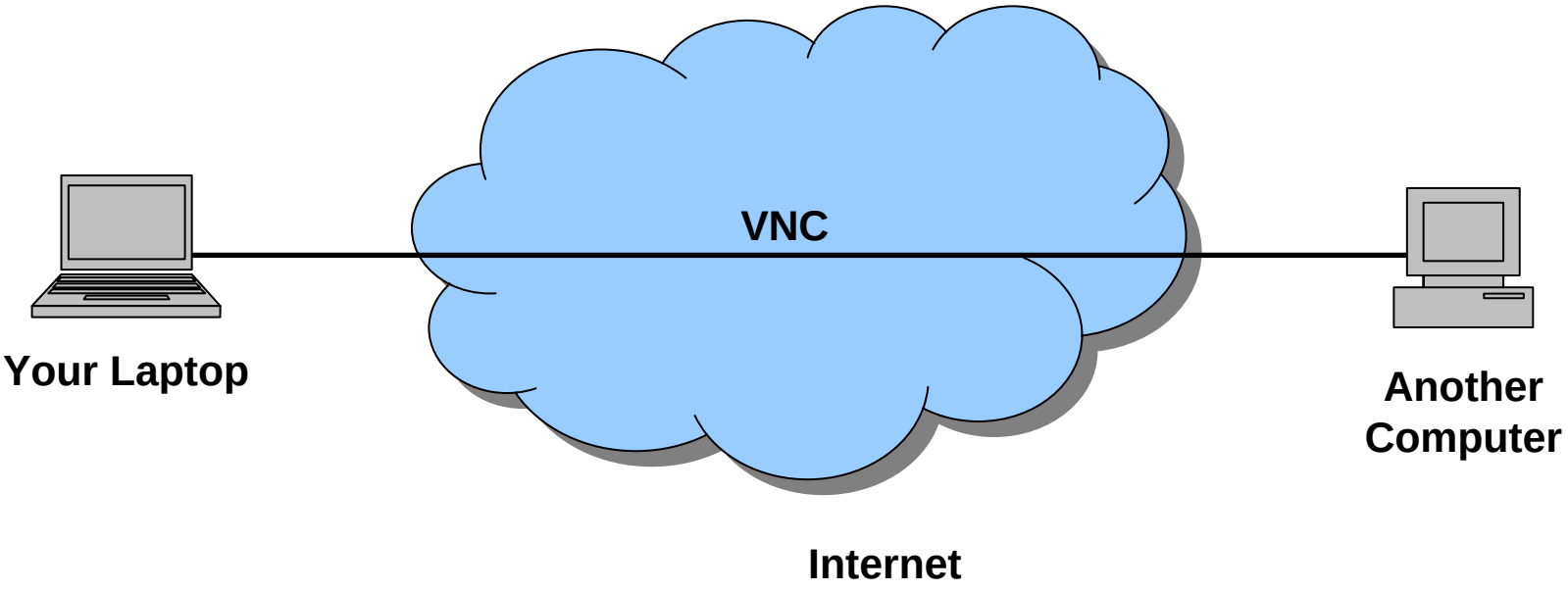
Tarantella


Portal-
Server
Gateway
HTTPS
Your Laptop
Internet
DMZ
Portal Server,
Web Server
Tarantella
Server(s)
Corporate
Network

VNC

- **Virtual Network Computing**
- **Interact with one computer (Server) by using a simple program (Viewer) on another computer**
- **Fully cross platform (e.g. Viewing Solaris on Windows)**
- **Free and publicly available**
- **Not secure**
  - Sends clear text (except perhaps the password)
- **Needs a VPN or SSH**
- **Includes an optional web server**
  - Runs on the Server machine on port 5800 by default
  - Allows the Client to connect via a Java interface in a browser
  - Such web servers are typically prohibited in a corporate network
- **Interface is more primitive and slower than Citrix**
- **May not be permitted**

VNC



Access Grid

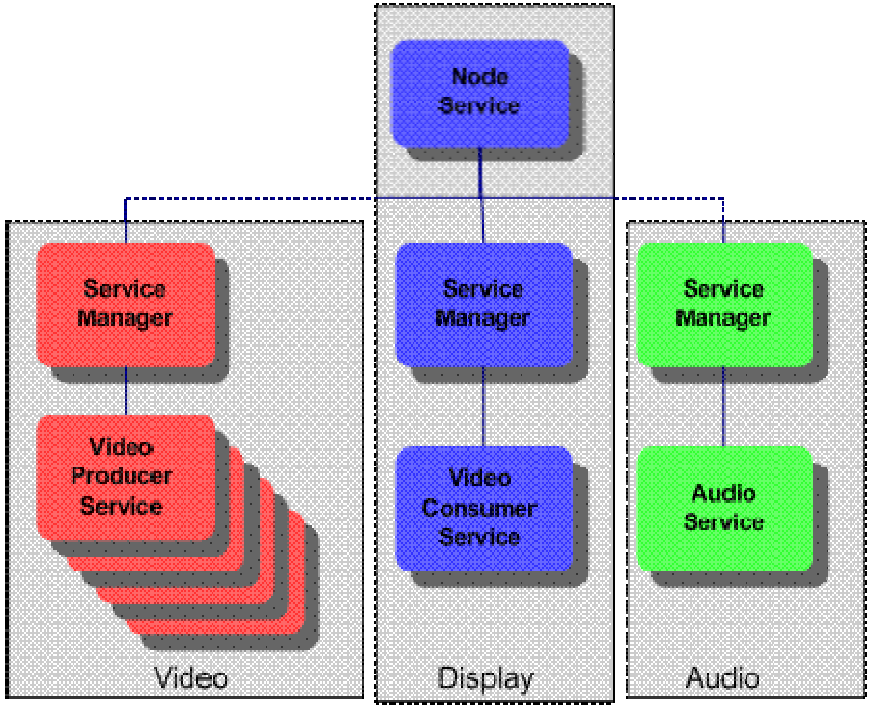
- **The Access Grid is a large ensemble of resources**
  - Multimedia large-format displays
  - Presentation and interactive environments
  - Interfaces to Grid computing and to visualization environments
- **Developed by the Futures Laboratory at Argonne**
  - http://www.accessgrid.org/
- **Open source**
- **Runs on**
  - Linux
  - Windows
  - Possibly others

Access Grid

- **Designed for teleconferencing**
- **Has a virtual meeting place, called a Virtual Venue**
  - There is a Venue Server running somewhere
- **The Venue provides users with all the necessary information needed to communicate with each other**
  - Audio and video streams, user capabilities, data, services, applications, connections to other Venues, etc.
- **Security is via certificates**
  - Superior to a password strategy
  - Certificate belongs to the user
  - You request and configure your certificate only once
  - You can then export it to other machines
  - See: http://www.globus.org/security/
- **Do not need a password or account on the corporate network**

Access Grid

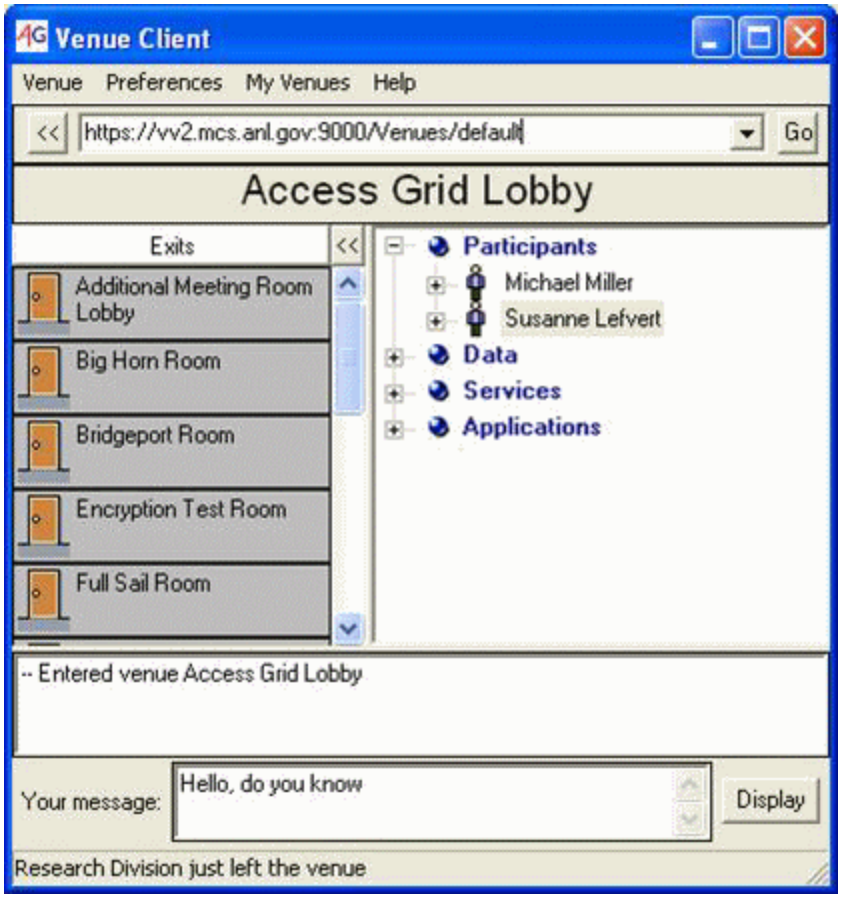
- **Each institution has one or more AG nodes**
  - Typically contain high-end audio and visual technology
  - Separate Display machine, Video Machine, Audio Machine



  - Can all be run on one machine if desired

Access Grid

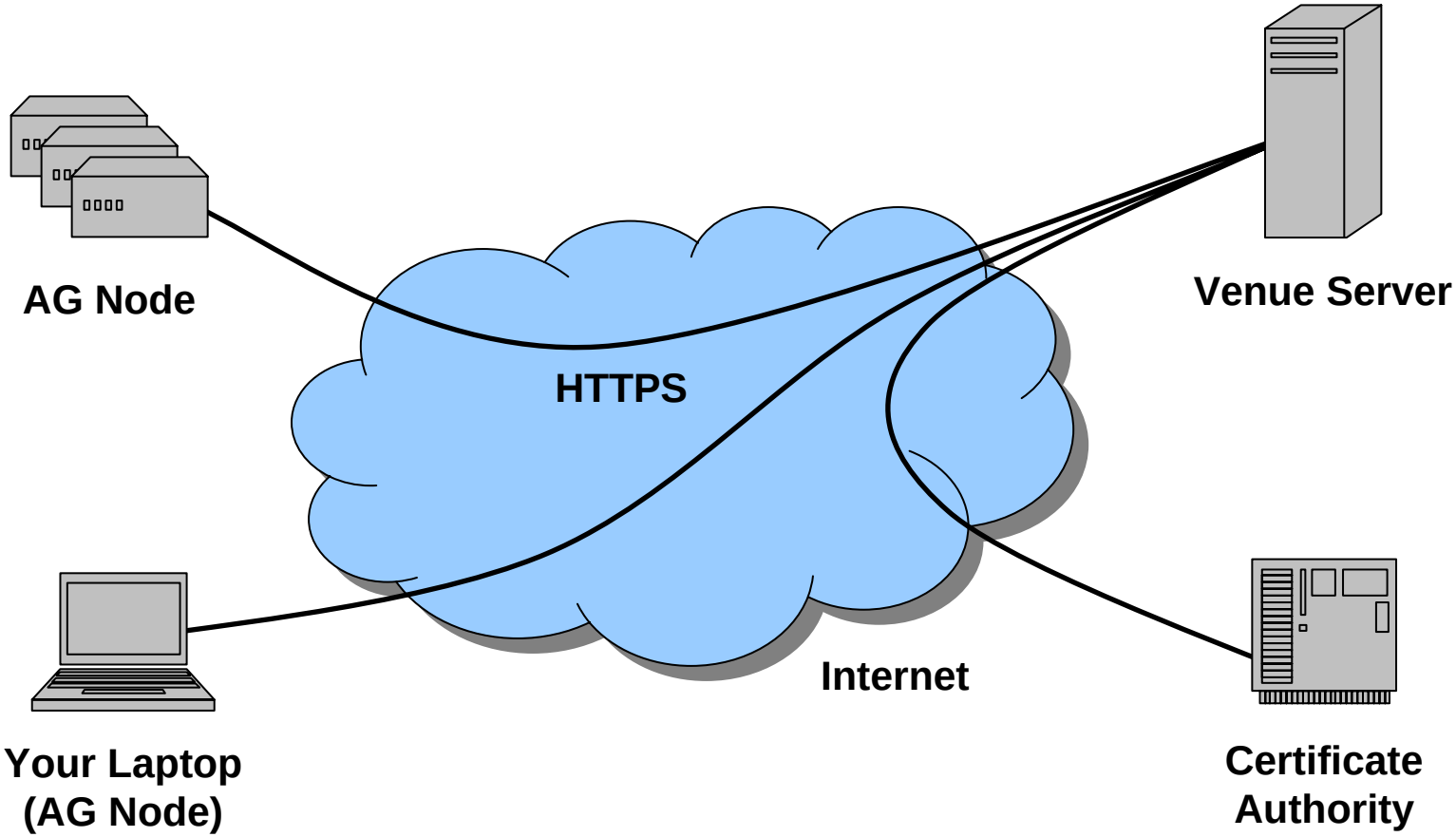
- **You use the Venue Client to manage your session**



Access Grid

- **Installation is large but not difficult**
- **Can be done on one machine (e.g. Your Laptop)**
- **You do not need to use all the available capability**
- **Can use VNC to connect to an internal computer AG node**
- **Can add other features as you need them**
  - E.g. Video is a common need
- **These extra features are not typically available with the other methods described in this presentation**
  - Makes it an attractive alternative if you have other needs

Access Grid


AG Node
HTTPS
Venue Server
Internet
Your Laptop
(AG Node)
Certificate
Authority

Wireless

- **There is little difference in most of the subjects covered here whether you connect via Wireless or some other kind of Internet connection**
- **Wireless networks are typically provided in:**
  - Hotels
  - Airports
  - Coffee Shops
  - Facilities like the APS or SNS
- **Once you have a connection, you proceed as usual**
- **Wireless communications can be intercepted by anyone with an appropriate antenna**
- **The security built into the standard wireless protocols such as 802.11 tends to be weak**
- **Using a VPN or Citrix should be relatively safe**

EPICS on Windows

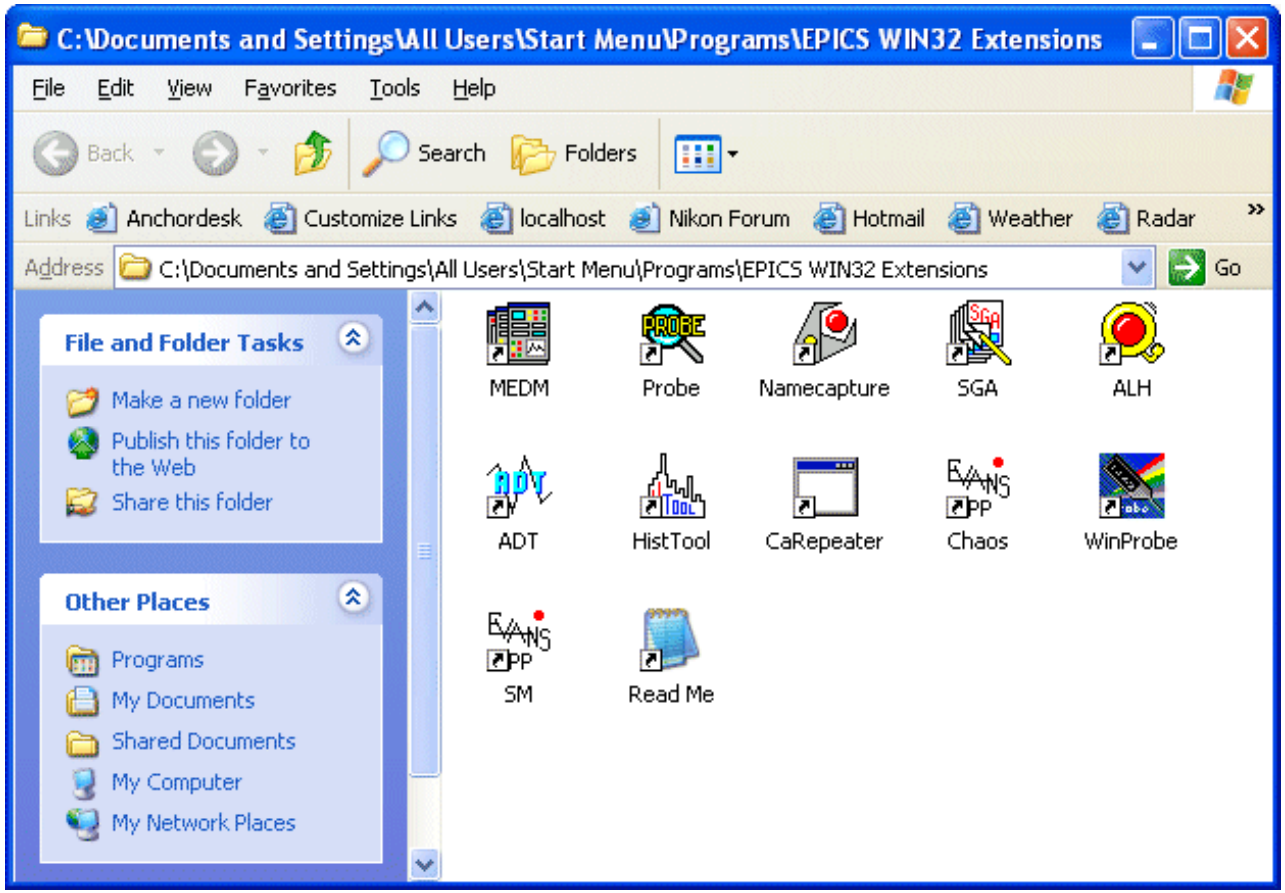
- **EPICS applications (e.g. MEDM) are typically written for UNIX and Motif / X Windows**
- **You can run them by connecting to an internal UNIX machine**
  - All Channel Access traffic goes over the wire
  - All X traffic goes over the wire
  - But, there is far more X traffic than EPICS traffic
- **You can avoid this by running them locally**
  - Will be much faster
  - Accessing system ADL files may be a problem
- **You want a way to run MEDM, etc. on Windows**
  - The remote machine (Your Laptop) is usually Windows
  - The Citrix desktop is Windows
- **You can use Exceed and the EPICS WIN32 Extensions to do this**

Exceed

- **Hummingbird Exceed**
  - Arguably the best Windows X Server
  - The only viable source of Motif libraries for Windows
  - Possible to use other Windows X Servers but it is not supported
  - See a System Administrator to get Exceed installed
- **You can also use Exceed to connect to other computers**
- **Use the Exceed Xstart utility**
  - Secure Shell is the preferred Start method (or may be required)
  - The command is usually “xterm &”
  - ☑ Show progress is suggested
  - ☑ Show host reply for debugging
  - (The location of these settings varies with the Exceed version)
- **Exceed is already installed on the Citrix servers**

EPICS WIN32 Extensions

- **Package of the important EPICS applications**
  - Built to run on Windows



How to Install the EPICS WIN32 Extensions

- **Information can be found at**
  - http://www.aps.anl.gov/epics/distributions/win32/index.php
- **There is an InstallShield installer located at**
  - http://www.aps.anl.gov/epics/download/distributions/index.php
  - You usually want the latest version there
- **The installation is easy and should not mess up your computer**
- **Uninstalling them is also easy**
  - If you be sure to stop all running programs first
  - Closing Exceed stops all except CaRepeater
- **Read the README before starting!**
- **Install Exceed first**

- **You already did all this if you installed the Virtual Linac**

Storage-Ring Shortcut

- **It is convenient to make shortcuts to ADL files**
  - E.g. the Storage-Ring main screen at the APS
- **Right drag the MEDM menu item from the programs menu to your desktop and rename it Storage Ring**
- **Right click it and choose Properties**
- **Add the following to the end of the command after the quotes:**
  -x \\oxygen\adlsys\sr\psApp\sMain.adl
- **Change the Start in: item to \\oxygen\adlsys**
- **Set the following environment variables**
  - EPICS_CA_ADDR_LIST to point to the Main Gateway
  - EPICS_CA_AUTO_ADDR_LIST=NO
  - EPICS_DISPLAY_PATH=\\oxygen\adlsys;\\oxygen\xfdsys
- **Click the icon to bring up the Storage Ring main screen**
- **Change these directions as necessary for your situation**

ADL Files

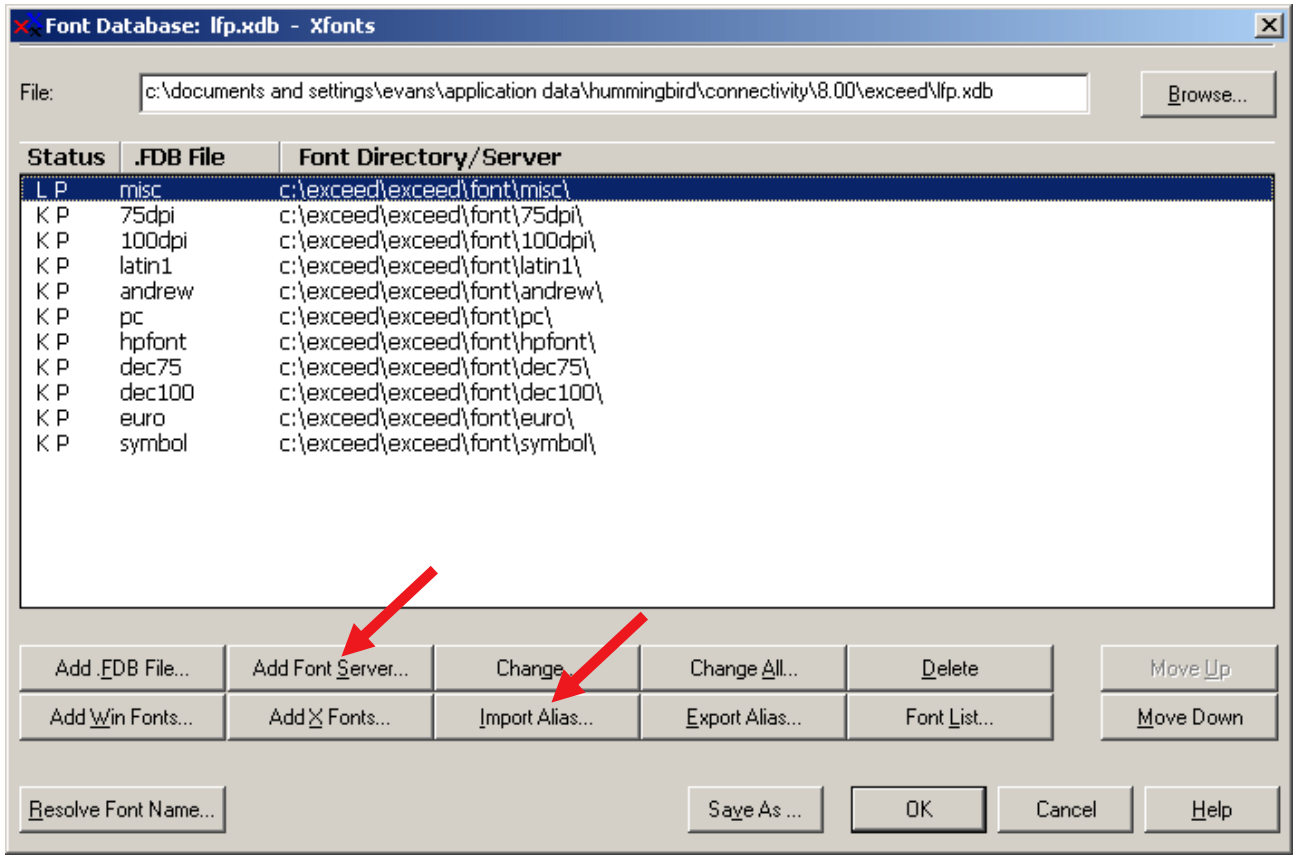
- **You need ADL files to run MEDM**
- **These are usually found on the internal file system**
- **You have two choices**
  1. Copy them to Your Laptop
     - *You do not then require a connection to the file system*
     - *MEDM will be faster*
     - *But they will get out of date*
     - *This may be useful if you only have a few*
  2. Link to the ones on the internal file system
     - *You probably have a VPN connection or are using Citrix, anyway, so this is not a problem*
- **The preceding slide shows one way to link to the internal file system to get ADL files**
  - Or, make a link in your home directory, mount that directory

MEDM Fonts

- **MEDM uses font aliases for flexibility**
- **However, they are not in Exceed by default**
- **Installing them is slightly different for different versions of Exceed**
- **There are detailed instructions on the MEDM page at:**
  - http://www.aps.anl.gov/asd/controls/epics/EpicsDocumentation/ExtensionsManuals/MEDM/MEDMFonts.htm
- **Essentially, there are two ways**
  - Use a font server
  - Install them in Exceed locally

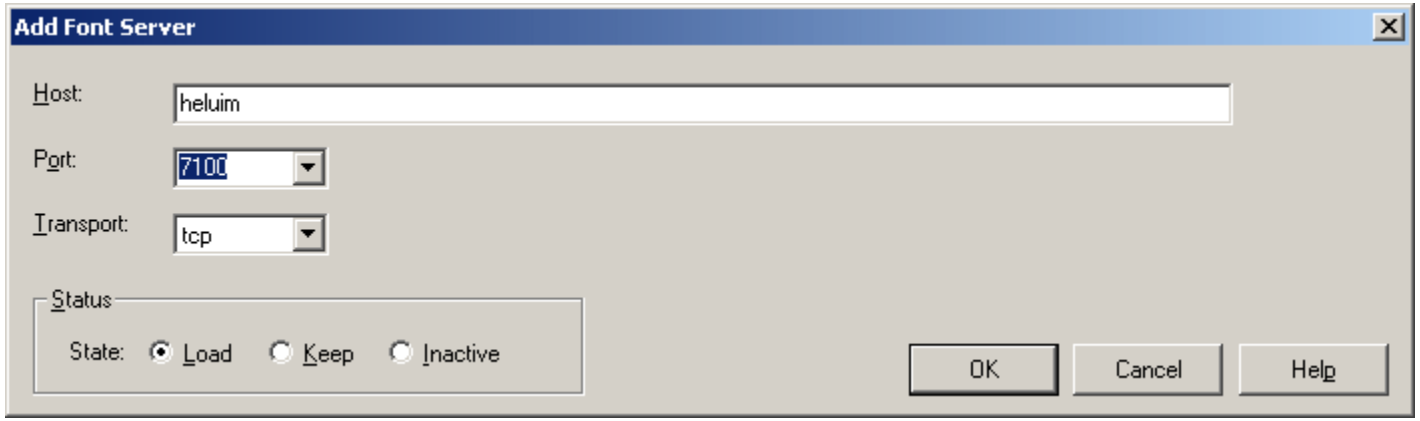
Exceed Xconfig Utility

- In both cases you start with the Exceed Xconfig utility
- Go to Font Management and choose Edit



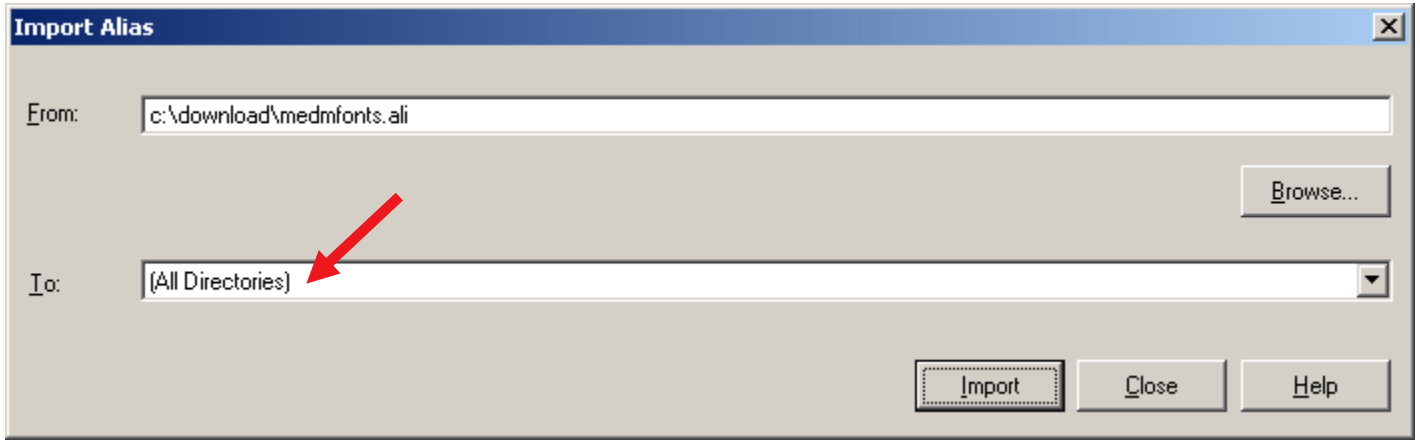
Use Font Server

- **Choose Add Font Server**
- **Fill in the parameters**
  - Get them from your system administrator



Install Font Aliases Locally

- **Download medmfonts.ali from the MEDM page**
  - Or copy the lines from this file (or the manual) to a local file
- **Choose Import Alias**
- **Be sure to pick (All Directories) for To:**



- **You can see where they got installed and uninstall them by double clicking the line for misc or 100dpi in the Font Management dialog**

Acknowledgements

- **Extensive help for this presentation and discussions were provided by**
  - Ken Sidorowitz
  - Steve Potempa
  - Dave Leibfritz
  - Roger Sersted
  - Brian Tieman

Thank You

This has been an

APS Controls Presentation

Thank You

This has been an

APS Controls Presentation