



## EX LIBRIS TECHNICAL SEMINAR

May 9-10, 2011



Milwaukee, WI

Managing Voyager in Small Libraries  
Supporting Your Server  
Laura Guy

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# This Is Me

- ★ Supporting “servers” since mid-80’s
- ★ Supporting Voyager servers for eleven years
- ★ Not a *real* sysadmin (I’m a librarian!)
- ★ Supported Solaris Voyager O.S.\*
- ★ Know nothing about split servers other than there are special configuration considerations

\* Switching to Linux this summer.



# My Rules of Engagement

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- ★ Never make a change on a Friday
- ★ Always understand what you are doing
- ★ Don't do anything you don't **need** to do
- ★ Never rush into something; THINK first
- ★ Make backup copies of files you change
- ★ Make one change at a time
- ★ Don't start a land war in Asia 😊



# What Are We Going to Cover?

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- ★ Things that I'm glad I know
- ★ Things that I have wished I'd known
- ★ Things that I think are important
- ★ There's nothing worse than feeling helpless...
- ★ ...or clueless
- ★ ... or useless



# Agenda

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- ★ You Should Know...
- ★ We're Talking Now!
- ★ Processes
- ★ *Killing Your Server*
- ★ When Things Go Right
- ★ When Things Go Wrong



# Stuff You Should Know

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- ★ Basic O.S. commands (**handout**)
- ★ vi Unix editor; vi = “visual” (**handout**)
- ★ Starting and stopping “things” (**handout**)
- ★ PuTTY (secure “Telnet”)
- ★ WinSCP (secure “FTP” for uploading/downloading files and more!)
- ★ Your configuration, software versions, etc.



# Our Major Players

- ★ Apache – Web Server
- ★ Tomcat – Java virtual machine
- ★ Voyager – ExLibris ILS software
- ★ Oracle - rdbms (database software)
- ★ Operating System - Solaris, Linux, Windows...
- ★ Clients - Cataloging, Acquisitions, Circulation...



# Terminology

- ★ File – bits on disk or tape
- ★ Program – executable, binary
- ★ Script – ASCII file (editable) talks to shell
- ★ Shell – command interpreter (UI); talks to kernel
- ★ Kernel – core or key components of the O.S. (includes process mgmt.); talks to hardware

# Terminology

- ★ Database – a system that organizes, stores, and retrieves large amounts of data.
- ★ Oracle – RDBMS
- ★ VGER instance – Oracle application
- ★ Tablespace – database data storage
- ★ Database schema – object ownership associated with a unique “username” (e.g., csmdb)



# Terminology

- ★ / – “root” directory of the server
- ★ /m1 – base directory for Voyager
- ★ /m1/voyager – all Voyager files on the Unix server are under this directory
- ★ /m1/voyager/xxxdb – database directory containing all database-specific files
- ★ Use WinSCP to look around the file structure



# Voyager versus Root User

- ★ Login via console or remotely.
- ★ Always be aware of **who you are!**  
who am I command
- ★ Use the `pwd` command to find out *where* you are.
- ★ Most work is done as voyager user.
- ★ Be very, very careful when you're root user.
- ★ voyager and root users each have their own *crontabs...*



# Questions?



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# Talking To Your Server

- ★ When you log in, you are said to be at the command line or command prompt. This is where you enter UNIX commands:

```
$date Fri Mar 1 22:59:28 EDT 2011
$uptime 10:59PM up 259 days, 9:44, 5 users, load average:
3.81, 14.27, 13.71
$hostname gonzo
```

- ★ You can combine commands in a file called a **script** that allows you to run them one after another.



# Scripting Essentials

- ★ Scripting allows you to automate tasks.
- ★ If you do it more than once, use a script.
- ★ If you script it, document your script.
- ★ If you don't have a doc system, start one.
- ★ If you change something, document it.



# Writing Scripts

- ★ Unix shell scripting is not difficult to get started with. If you regularly run a command manually, just put it into a script with a meaningful name and run the script instead - fewer keystrokes, fewer errors, easier to remember. A script can be just one command, it doesn't have to be long or complex. If you've ever written a DOS batch file, you can write a Unix shell script - more easily, in fact, because Unix has so many more commands which do useful things than DOS does.



# Example of Korn Shell Script

---

```
#!/bin/ksh  
date  
uptime  
hostname
```

★ To run: `./example.ksh`

★ Note the file must be **executable!**



# File Permissions

★ When you first create a shell script, it will usually not be executable. Use the **chmod** command with the **+x** option to add the execute permissions

```
– chmod +x example.ksh
```

★ Use the `ls -l` command to list a file's permissions

★ 3 permissions levels: read, write, execute



# chmod Command

- ★ Used to set/modify a file's permissions.
- ★ Read the man pages!
- ★ You can change the entire permission pattern of a file in a single go using one number:
  - `chmod 755 example.ksh` (*755: I don't mind if other people read or run this file, but only I should be able to modify it*)



# Critical Task Scripts

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## ★ Master Script (or scripts):

- Shuts down services
- Runs backup
- Rotates logs
- Brings services back up
- Runs Circ and Acq jobs
- Loads patrons



# Other “Less Critical” Scripts

- ★ Log CPU, memory, disk and pagefile stats with mpstat, vmstat, iostat and sar respectively, to warn you if anything hits 90% of capacity.
- ★ Look for errors or warnings in critical Oracle and System log files.
- ★ Report on /data and /mfhd.data file sizes (regen warning).
- ★ Rotate logs/reports



# Nice-To-Have Scripts

---

- ★ Cleanup of rotated log/report archive directories
- ★ OPAC is up
- ★ Email is working
- ★ Any other tasks you do frequently...



# Backup Script

- ★ Backups are mandatory (in your contract!)
- ★ Full easier to recover from than incremental.
- ★ “Cold” is best where you **shut down everything**.
- ★ Use tape rotation.
- ★ Rotate tapes off-site.
- ★ Listen to Ex Libris and follow their advice.
- ★ Monitor your backup logs daily.



# Cron

- ★ cron is a unix, solaris utility that allows tasks (such as running a script!) to be automatically run in the background at regular intervals by the cron daemon. These tasks are often termed as cron jobs.
- ★ crontab (CRON TABLE) is a file which contains the schedule of cron entries to be run and at specified times.



# Crontab Commands

- ★ `crontab -e` Edit your crontab file, or create one if it doesn't already exist.
- ★ `crontab -l` Display your crontab file.
- ★ `crontab -r` Remove your crontab file.
- ★ **Note :** If you inadvertently enter the crontab command with no argument(s), do not attempt to get out with Control-d. This **removes all entries** in your crontab file. Instead, exit with Control-c.



# Crontab

- ★ A crontab file has five fields for specifying day, date and time followed by the command to be run at that interval.

```
* * * * *      command to be executed
- - - - -
| | | | |
| | | | +----- day of week (0 - 6) (Sunday=0)
| | | +----- month (1 - 12)
| | +----- day of month (1 - 31)
| +----- hour (0 - 23)
+----- min (0 - 59)
```

# Cron Output

- ★ By default cron jobs send an email to the user account executing the cronjob.
- ★ To collect the cron execution log in a file:

```
30 18 * * * rm /home/someuser/tmp/* >  
/home/someuser/cronlogs/clean_tmp_dir.log
```

- ★ **ExL: DO NOT CRON REGENS!**



# Cron Example: OPAC Test

```
#  
# Check the status of the OPAC. Every day at 5:07am, email  
Tim and Laura the results  
#  
07 5 * * * /usr/local/utils/TestCatalog.pl | mailx -s  
'Voyager OPAC status' tim@coalliance.org lguy@mines.edu  
Panderse@mines.edu  
#
```



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```
#!/m1/shared/bin/perl
#
# TestCatalog.pl 2010/03/02 Ken Herold
# Hamilton College
# See if OPAC is available
#

use LWP::UserAgent;

$suri = "http://voytest.coalliance.org";
$sua = LWP::UserAgent->new;
$response = $sua->get($suri);
$status = $response->status_line;

if ($status =~ m/200/) {
print "OPAC is OK\n";
}

if ($status =~ m/503/) {
print "OPAC is DOWN\n";
}

exit(0);
```



# Weekly Restart Crontab Example

---

```
#  
# Reboot the server 8:00am every Sunday  
# Changed to init 6 as per ExL 11/2009  
0 8 * * 0 /usr/sbin/init 6  
#
```



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# Questions?



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# Getting to Know All About You

- ★ Each system and end-user task is contained within a **process**. The system creates new processes all the time and processes die when a task finishes or something unexpected happens.
- ★ Make list of processes by running: `ps -ef`
- ★ Look for processes owned by the users oracle, voyager and elgweb (Apache's httpd).



# Process List Command

- ★ The `ps` command is used to list all running processes:
  - `ps -ef`
- ★ Important system processes are owned by root. Root starts an Apache process, but then it forks off children owned by "nobody" to actually accept connections. Oracle consists of several worker processes, plus the listener, and specific connections made by Voyager processes. Voyager itself usually runs a permanent Z39.50 server for each database and one WebAdmin daemon, plus a `svr` process for each connected client, some of which spawn a `keysvr` process.



# Useful Process Commands

★ `ps -ef | grep voyager`

★ `ps -ef | grep ora_`

★ `ps -ef | grep http`

★ `ps -ef | grep java`



# Questions?



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# Intentionally Killing Your Server

- ★ It's useful to see what "death" looks like in the browser, in the client, and when you do a `ps -ef` command on the server
- ★ You can kill Oracle, Apache, Tomcat, Voyager
- ★ Scripts located in `/etc/init.d`
- ★ See the **handout** with list of commands
- ★ Run `ps -ef` when server is up for baseline comparison purposes
- ★ I don't suggest you kill your O.S. ☺



# Apache – the Web Server

- ★ If broken you'll get a browser display error
- ★ Check Apache using the command:  

```
- ps -ef | grep httpd
```
- ★ If it is **running** you'll see six or so lines of identical httpd processes
- ★ If you only see your grep process try to restart it:  

```
- /etc/init.d/httpd2 start
```



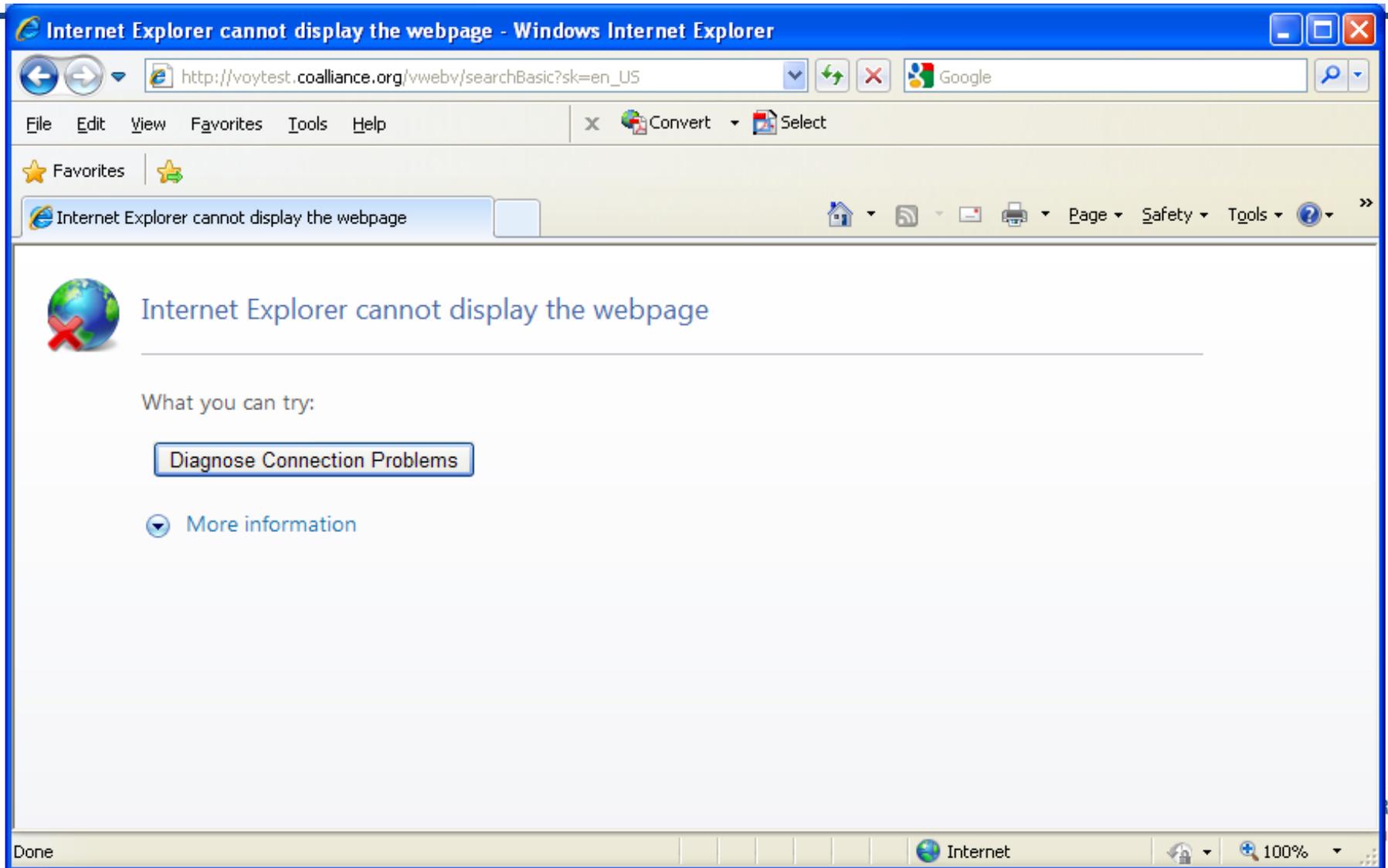
# Apache Logs

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- ★ /m1/shared/apache2/logs/xxxdb
- ★ access\_log
- ★ error\_log



# Apache Down!



# Tomcat – Java Virtual Machine

- ★ Apache hands off requests to the vwebv Tomcat process.
- ★ The vwebv Tomcat process hands off to the vxws process. The vxws process takes the data from opacsvr and hands it back to vwebv.
- ★ If Tomcat is broken you'll see a page with a 500 or 502 or 503 error code, or a WebVoyage-branded error page.



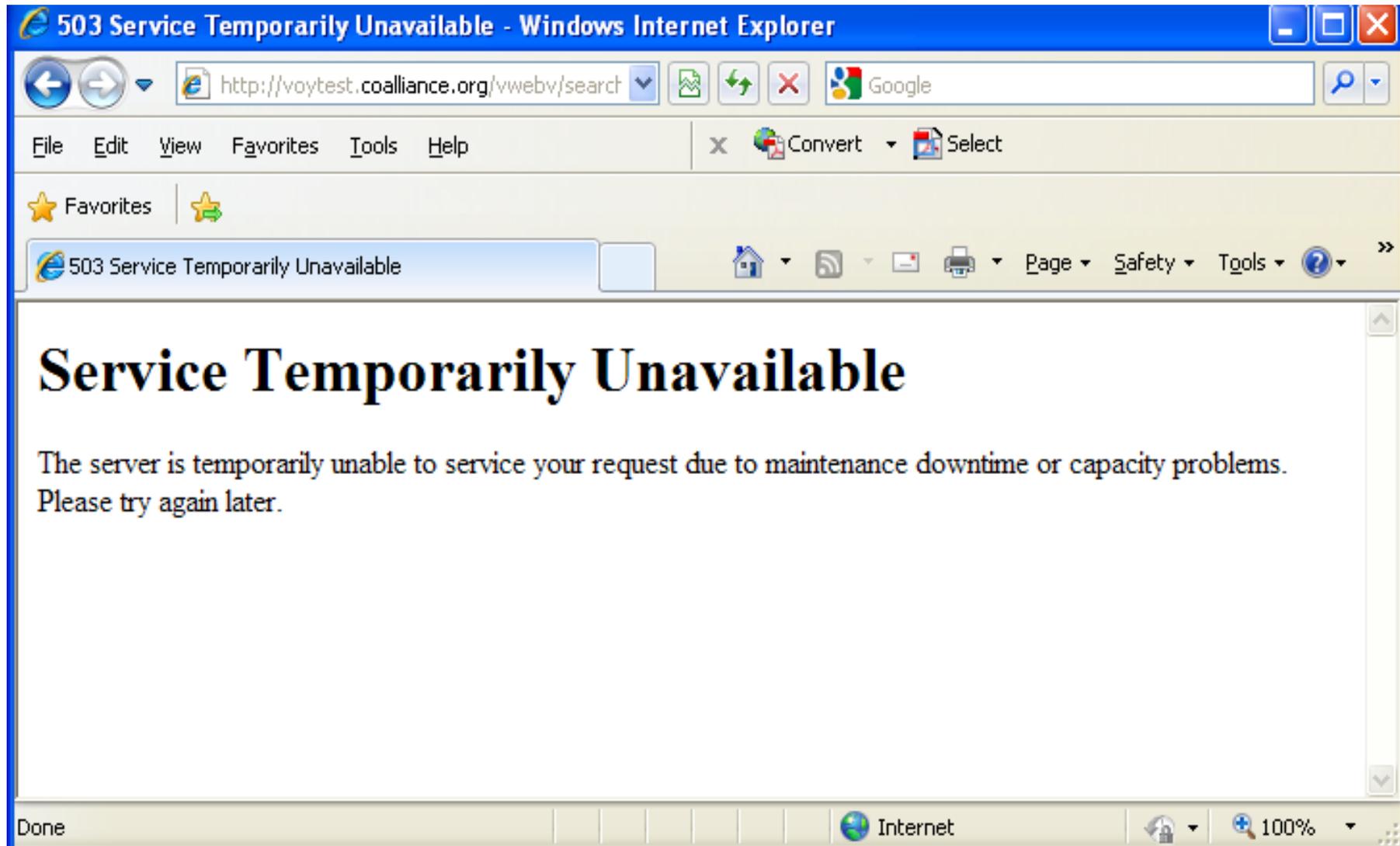
# Tomcat Logs

---

- ★ /m1/voyager/xxxdb/tomcat/vwebv/logs
- ★ /m1/voyager/xxxdb/tomcat/vxws/logs
- ★ Note logs are **OVERWRITTEN** at restart!



# Tomcat Down!



# Voyager – ILS Software

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- ★ If down you'll get a page with a 50x error in your browser.
- ★ You'll get a connection refused error when attempting to login to a client.
- ★ You won't see opacsvr, keysvr processes running.



# Voyager

- ★ The “xxxdb” structure is repeated for each database, including traindb
- ★ Key directories:
  - /m1/voyager/xxxdb/ini – The configuration files including voyager.env
  - /m1/voyager/xxxdb/data – The keyword files
  - /m1/voyager/xxxdb/mfhd.data – The holding keyword files
  - /m1/voyager/xxxdb/log – The log files for the specific database
  - xxxdb/tomcat/vwebv/context/vwebv/ui – root directory for skins



# Don't Touch

- ★ /m1/voyager/**bin**/2007.x.x – The server binaries (including WebVoyage & WebAdmin binaries)
- ★ /m1/voyager/**lib**/2007.x.x – The server libraries
- ★ /m1/voyager/xxxdb/**sbin** – The server scripts



# Voyager Logs

- ★ Voyager Server Logs
  - /m1/voyager/xxxdb/log/log.voyager
  - /m1/voyager/xxxdb/log/z3950svr\_access.log
  
- ★ Voyager Deleted Records Logs
  - /m1/voyager/xxxdb/rpt/delete.item
  - /m1/voyager/xxxdb/rpt/delete.bib
  - /m1/voyager/xxxdb/rpt/delete.mfhd
  
- ★ Locations of upgrade/patch logs vary

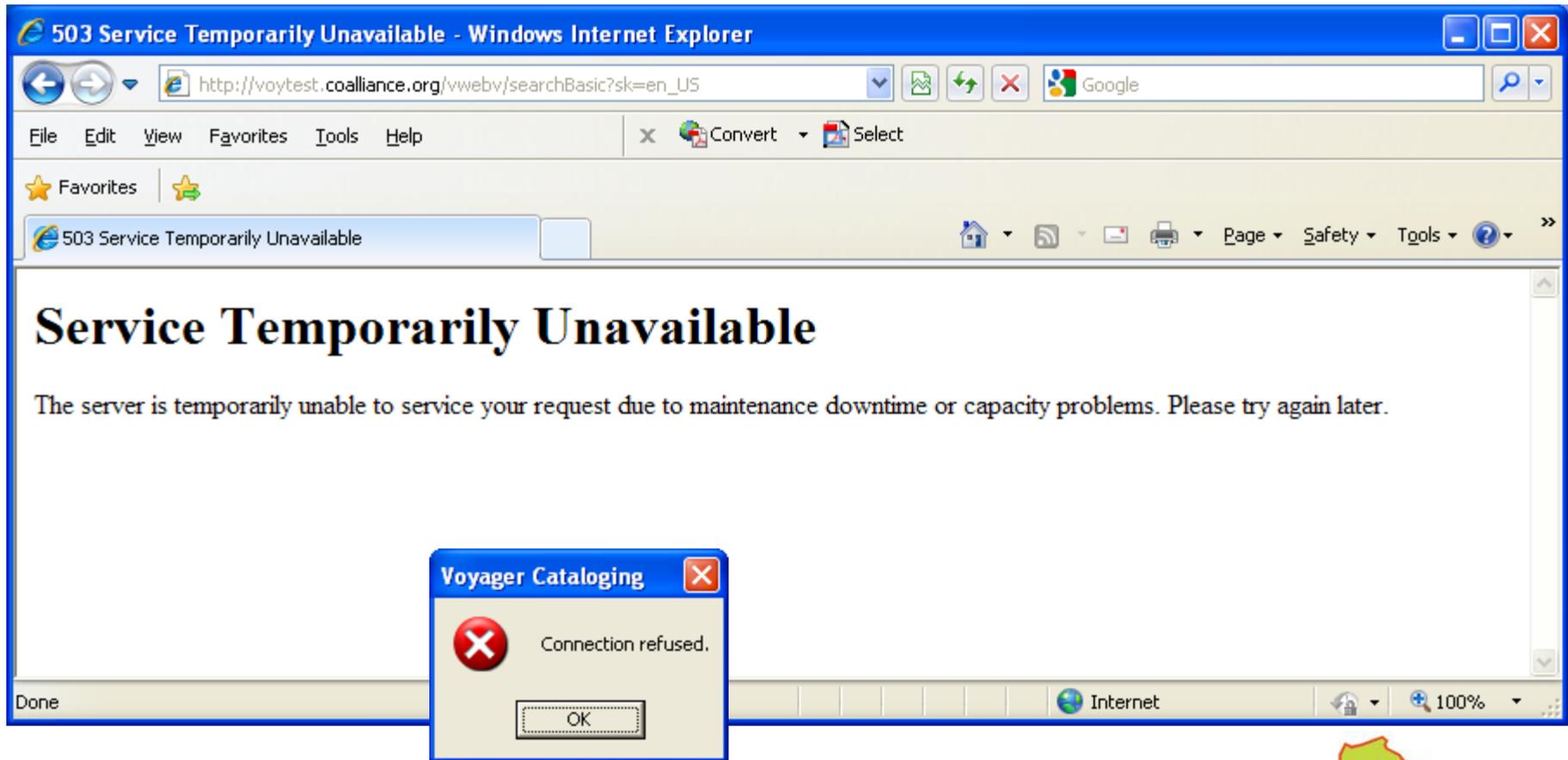


# Voyager Housecleaning

- ★ Things to clean up, IF files are no longer needed
  - Directories:
    - xxxdb/rpt
    - xxxdb/log
    - xxxdb/edi
    - xxxdb/tmp
  - /m1/incoming
  - /m1/upgrade/v<version>/voyYYY



# Voyager Down!



# Oracle

- ★ When Oracle goes down the ramifications are severe. This is where your data are stored.
- ★ Check to see if your Oracle listener is up:
  - `lsnrctl status`
- ★ Or look for processes owned by the user oracle in the output of:
  - `ps -ef | grep ora_`



# Oracle VGER Instance

- ★ Multiple voyager databases share common instance
- ★ The VGER instance background processes:

pmon	smon
lgwr	dbw0 (formerly dbwr)
ckpt	reco
arch0	s000 & d000
qmnc	cjq0

★ `ps - ef | grep ora_` look for pmon, smon, lgw, dbw0



# Indexes

- ★ All about searching
- ★ Types of Indexes
  - Voyager indexes = Primary indexes  
Actually an Oracle table (bib\_index)
  - Oracle indexes = Secondary indexes  
bib\_index\_code\_norm\_disp\_idx
  - Keyword indexes = Keyword indexes  
External to Oracle
  - Headings keyword indexes  
Utilize Oracle Context



# When to Regen Keyword Indexes

- ★ 2 GB file size limit of dynamic.dc
- ★ Soft threshold (formula):  
If size of your dynamic.dc file compared to your xxxxdb.1.dc is 50% or greater, a keyword regen probably is needed
- ★ Run this command: `ls -la`



# Why Regen

- ★ Corrupted keyword files
- ★ You see keysvr error messages in log.voyager
- ★ Degraded performance in keyword searching (the formula)
- ★ Opac, cat, bulkimport issues
- ★ Regen ETA = 1 hour per 100,000 records.



# Oracle Logs

## ★ Instance – level logging:

Solaris/AIX

`$ORA_LOG/alert_VGER.log`

Windows

`D:\oracle\admin\VGER\bdump>alert_vger.log`

## ★ Oracle networking logs:

– `$ORA_NET/./log/sqlnet.log`

– `$ORA_NET/./log/listener.log`



# Oracle/Oracle Listener Down!

WebVoyage System Error - Windows Internet Explorer

http://voytest.coalliance.org/vwebv/searchBasic?sk=en\_US

File Edit View Favorites Tools Help

WebVoyage System Error

CATALOG ARTHUR LAKES LIBRARY TEST SERVER

**System Error**

An unexpected system error has occurred. Please report this error to your library. We regret the inconvenience.

This page will redirect to the system start page shortly.

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Voyager Cataloging

Voyager is not available.

OK

Done Internet 100%

# Questions?



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# When Things Go Right – OPAC Tech Flow

1. Web Client Starts
2. Connect to server at known port
3. Apache Daemon communicates with vwebv (Tomcat)
4. Vwebv communicates with server at known port
5. Apache Daemon communicates with vxws
6. JDBC Connection is made to Oracle
7. Connection to Oracle made via Oracle Listener
8. Dedicated connections are made btw  
Listener and Oracle Database
9. Connection to Opac Server Pool
10. Individual Opac Server makes separate connection
11. Binary logs into Oracle (see server tech flow)
12. Oracle spawns a server process
13. Control returned to the client



# When Things Go Right – Client Tech Flow

---

1. Start a client
2. Next connect to server
3. Inetd runs The Script
4. The Script runs the binary
5. Binary logs into Oracle
6. Oracle spawns a server process
7. Successful connect returned to binary
8. Binary attempts to start a keyserver
9. Control returned to the client



# When Things Go Wrong

- ★ Determine what is **actually** wrong (PC or server?)
- ★ Are there error messages?
- ★ What changed?
- ★ Can you replicate it?
- ★ Test (check cables, different PCs, different Windows users, etc.)
- ★ Experience helps
- ★ Common sense helps too



# When Things Go Wrong

- ★ Ex Libris recommends weekly server reboot.
- ★ If you are having problems and your uptime is over 30 days, do a reboot.
- ★ Use **w** to check uptime and who's logged in:  
`voyager: / => w`
- ★ Use `df -k` command to check available disk space.
- ★ Look at last night's backup log!



# Can You?

- ★ Can you PuTTY into the server?
- ★ Is Oracle running? `ps -ef | grep ora_`
- ★ Check dir/file permissions for:  
sbin,bin,rpt,data
- ★ Can you log into sqlplus?
  - Look at voyager.env for USERPASS
- ★ Can you run: `tnsping VGER 3`
- ★ Look for errors in log.voyager, the Oracle alert\_VGER.log, the tomcat/apache logs, etc.
- ★ Try the ASCII OPAC (config issue?)



# Client Problems?

- ★ What changed? What happened?
  - Application Timed Out
  - Connection Refused
  - Unable to save this record
  - Run time error
- ★ Check voyager.ini file on the PC
- ★ Try a different PC
- ★ Try a different Windows user



# Browser Problems?

- ★ The browser on your PC connects to most web servers on port 80; that is probably the port it uses to get to your production WebVoyage
- ★ If you get an error that you can't reach the server, make sure it isn't your PC's Internet connection or the network itself.



# Log files

- ★ In general logs are more useful for **diagnosis** than prevention.
- ★ Default output often voluminous and includes spurious errors and warnings, and may simply be not meaningful.
- ★ Oracle high-water log (in the Oracle home directory) can be useful for Oracle tuning.



# Important Logs

- ★ log.voyager
- ★ alert\_VGER.log (oracle)
- ★ error\_ and access\_ logs (apache)
- ★ catalina.out (tomcat)
- ★ /var/adm/messages (solaris)
  - `grep -i warning /var/adm/messages*`
- ★ Upgrade logs if post-upgrade
- ★ /var/adm/sulog (for su attempts)
- ★ z3950svr\_access.log

# Using Tail in *Real Time*

- ★ tail -f log.voyager
- ★ press Enter key twice
- ★ replicate your issue
- ★ review log.voyager in “real time”
- ★ look for WARNING, ERROR, UNABLE



# More About Logs

## ★ Upgrade logs (version dependent)

- /m1/incoming/v720/vik/logs/voyager\_installation.log
- /m1/incoming/patch/voy723\_Files/logs/PatchLog.voy723
- /m1/voyager/upgrade/2007.2.0/xxxdb/upgrade/log.xxxdb.upgrade
- /m1/voyager/utility/2007.2.0/xxxdb/log.xxxdb.regen
- /m1/incoming/v720/voy<VER>\_Files/logs/PatchLog.voy<VER>

## ★ Software logs

- /m1/voyager/xxxdb/tomcat/vwebv/logs/catalina.out
- /m1/voyager/xxxdb/tomcat/vxws/logs/catalina.out
- /m1/voyager/xxxdb/log/log.voyager
- /m1/shared/apache2/logs/alert\*
- /oracle/app/oracle/admin/VGER/bdump

## ★ Find Command

- find /m1/incoming/v720 -type f -name "\*[LI]log\*" -ls



# Logwatch

- ★ Will catch things like failed ssh attempts, su attempts and what commands were run with su and sudo, give you a snapshot of filesystem free space, etc.

<http://sourceforge.net/projects/logwatch/files/>



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# Be Proactive: Disk Usage

★ The `df` (disk free) command can be used to look at available disk space

– `df -k`

– `df -h` (h=human readable)

★ The `du` command can be used to see disk usage for specific files and directories

– `du -dk /m1/* | sort -n | tail`



# Memory

- ★ The `vmstat` command reports statistics about kernel threads, virtual memory, disks, traps and processor activity.
- ★ Check `/var/adm/messages` (a system log file) for **swap** errors.



# “Tuning”

- ★ Oracle has “tuning.”
- ★ It’s all about resource allocation.
- ★ Tuned per hardware configuration (RAM, disks, # bytes/records) & contract.
- ★ Badly tuned shared memory, pagefiles, swap space, tablespace, bandwidth, etc. can all cause **issues...**
- ★ Your O.S. is tuned, too!



# R U Firewalled?

---

- ★ Incoming and outgoing packets **MUST** be allowed through your firewall(s), routers(s), & server(s)
- ★ What's your timeout?
- ★ Did your I.T. folks make a change?



# Stay Current!

- ★ Patch your O.S. (ExL will not do this for you)
  - MUST stop Apache, Voyager, & Oracle first
  - Check vendor's web site.
- ★ Keep your Voyager version current.
- ★ Keep 3<sup>rd</sup> party software (Tomcat, etc.) current.
- ★ Make sure your hardware is under warranty.
- ★ Consider an IT infrastructure support firm.



# Security is Important

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- ★ Keep current with patches
- ★ Monitor your logs
- ★ Enforce strong passwords and change them often
- ★ Use firewalls, SSH (PuTTY), WinSCP
- ★ Have good backups
- ★ Physical security: no **passwords** on post-its!



# You're Not Alone: Resources

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## ★ Voyager-L

- <http://voyager.ship.edu/voyagerl/>
- <http://listserv.nd.edu>

## ★ Voyager Administrators' List

- [voyager-administrators@googlegroups.com](mailto:voyager-administrators@googlegroups.com)

## ★ eService Knowledgebase

- <http://support.exlibrisgroup.com>



# You're Not Alone: Support

- ★ Voyager client build number.
- ★ Windows OS and service pack.
- ★ username/password for module as well as server.
- ★ specific replication steps (including examples).
- ★ **exact** error messages.
- ★ date and time problem occurred.
- ★ server address (IP#) you are pointing to.



# Questions?



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# Thank you for attending!

[lguy@mines.edu](mailto:lguy@mines.edu)