IBM Software Group

Troubleshooting File Transfers using WebSphere MQ File Transfer Edition (FTE)

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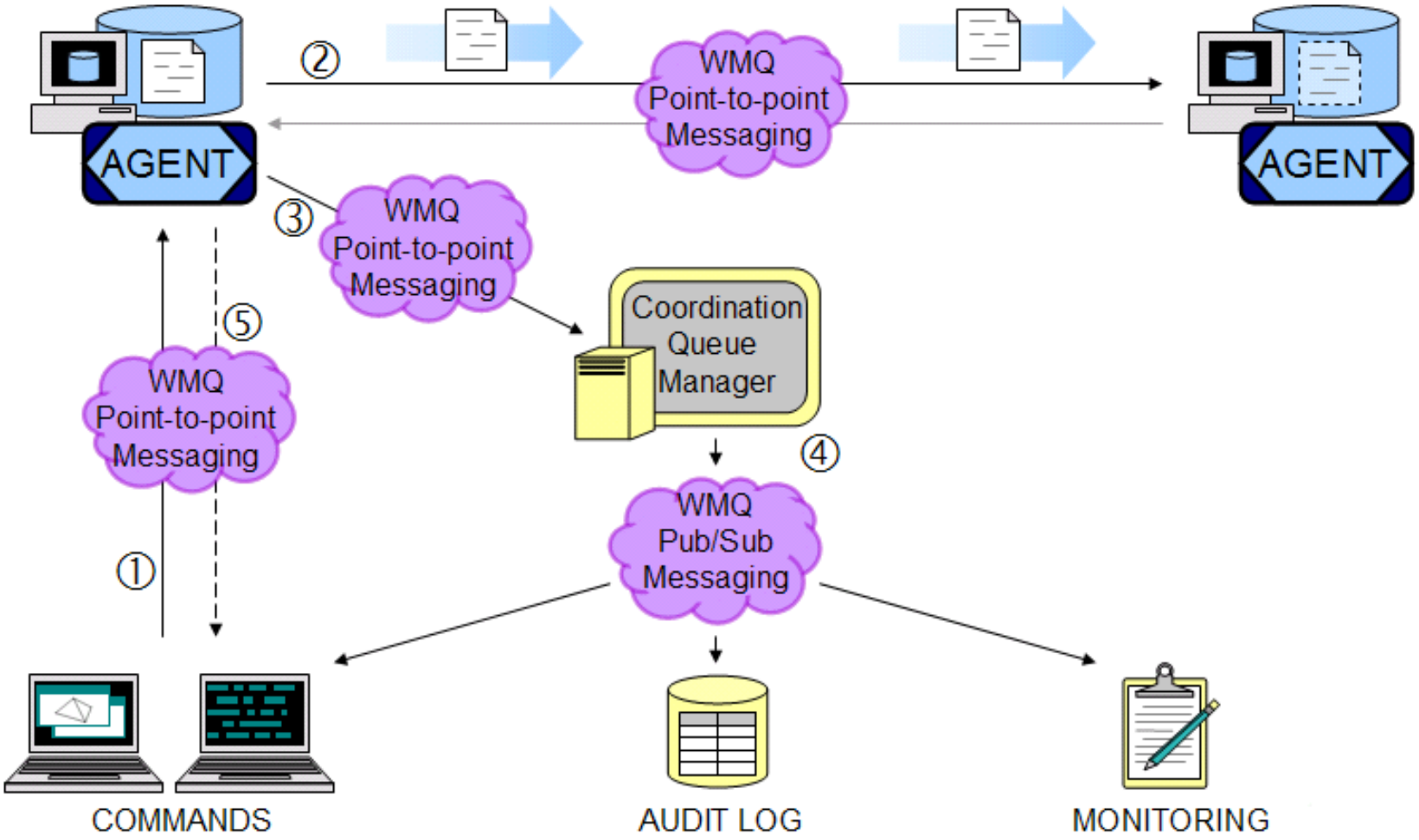
WebSphere® Support Technical Exchange

Agenda

- Overview of Messaging Paths
- Agents
- Transfers
- Some Gotchas
- Health Check
- Hints and Tips

Overview of Messaging Paths



Notes

- Step 1: the command line, or GUI sends an MQ point-to-point message to the source agent. This message is routed via the MQ network to a queue which the source agent is monitoring and contains instructions about the file transfer to perform
- Step 2: based on the instructions in the message, the agent performs some checking (is this user allowed to do this?) and then starts transferring a file to the destination agent. The file data is transmitted by packaging it as MQ messages and routing it through the MQ network to the destination agent which re-assembles the data into a file. The protocol used to efficiently and reliably transfer the file data involves some acknowledgement messages flowing from the destination agent to the source agent.
- Step 3: while the transfer (step 2) is progressing the agent is also generating both monitoring and audit information. Example monitoring information would be: “I’m 10% through the transfer… I’m 20% through…”. Example audit information would be “transfer of file ‘xyz.txt’ has completed for user ‘bill’ with a cryptographic hash of 1234”. This audit information is sent using MQ messages to a queue manager which has been designated as performing the “coordination” queue manager role
- Step 4: at the coordination queue manager both the monitoring and audit information is published (using MQ publish subscribe) to interested parties that might include the GUI, a database for archiving log information or monitoring tools
- Step 5: when the agent has completed transferring the file it can optionally send a notification back to the process which requested the file transfer operation. This uses the standard MQ request/reply pattern.

Agents – Won't Start

What to check

- Log files
  - output0.log
  - stderr.out
  - ffdc
- Filesystem
  - Unix®
    - df –k FTE_PARTITION
    - ls –laR
- Windows®
  - Check with Windows Explorer

Agents – Won't Start

What to Check continued-

- Agent qmgr status can be determined by
  - MQ Explorer
  - runmqsc QMGR
  - dspmq
- System Resources
  - Consult with System Administrator on how to check
    - CPU
    - Memory
    - Disk space

Agents - Hung

Possible Causes
- Default heap size not big enough
- Other

What to check
- Log files
- ffdc files
- System Resources

Agents - Hung

Diagnostics

- Javacores
  - Unix
    - kill -3 java_pid
    - Wait several minutes
    - Run the kill command again
    - Wait several minutes
    - Rund the kill command again
    - Send all javacores to IBM®

Agents - Hung

Javacores

- Windows
  - Run the agent process in the foreground.
  - fteStartAgent –F Agent
  - Enter the Ctrl+Break key sequence
  - Wait a few minutes, then create another javacore file

Agents - Hung

- Windows 2
  - An alternative to Windows 1, or if the WMQFTE agent is running as a Windows Service, the following property can be specified in the agent.properties file:

    javaCoreTriggerFile=c:\\temp\\trigger.txt

  - Note that the '\' character must be escaped with '\'. W
  - To generate a javadump, create or modify C:\temp\trigger.txt.
  - The javacore file should be created in the agent directory within 30 seconds.
  - javaCoreTriggerFile can be used on Unix also

Transfers – Failed

Possibilities

- Part of the message path is unavailable
- Permissions
- System Resources

What to check

- Transfer status in MQ Explorer
- MQ Channel Status
- Is the remote agent running?
- UserSandboxes.xml
- Receiving filesystem permissions and free space
- Log files for both sending and receiving agents

Transfers - Failed

Diagnostics

- End to End test using amqsput
- Did the request make it to the sending agent?
  - Stop the agent, resubmit transfer request, check SYSTEM.FTE.COMMAND.YOURAGENT
- Agent status using fteShowAgentDetail –v

Transfer - Failed

- Trace the agent
  - Enable trace on the running agent
    - fteSetAgentTraceLevel –traceagent =all Agent
  - Resubmit the transfer
  - Disable the trace after failure occurs
    - fteSetAgentTraceLevel –traceagent =off Agent

Common Gotcha's
#1 User name problems

- Symptom:
  - Messaging connectivity problems
    - Agent's can't send messages to one another
    - Messages never get published by the coordination queue manager
- Causes
  - User name that the agent (or commands) are connecting to MQ using is:
    - Not defined to one of the systems running a queue manager
    - Not correctly authorized to one of the systems running a queue manager
    - Longer than 12 characters (e.g. Administrator)
- Solution
  - Ensure that the user IDs used are:
    - Defined on each system hosting a queue manager, that FTE messaging traffic could pass through
    - Correctly authorized (a common mistake is to forget to authorize the user to the relevent transmission queues)
    - 12 characters or less
  - Use MQ samples, or MQ Explorer to generate test messages (while running as a particular user ID)
    - Check the progress of the test message through the system – is it DLQ'ed?

Common Gotcha's
#2 Monitor for '*', transfer '*'

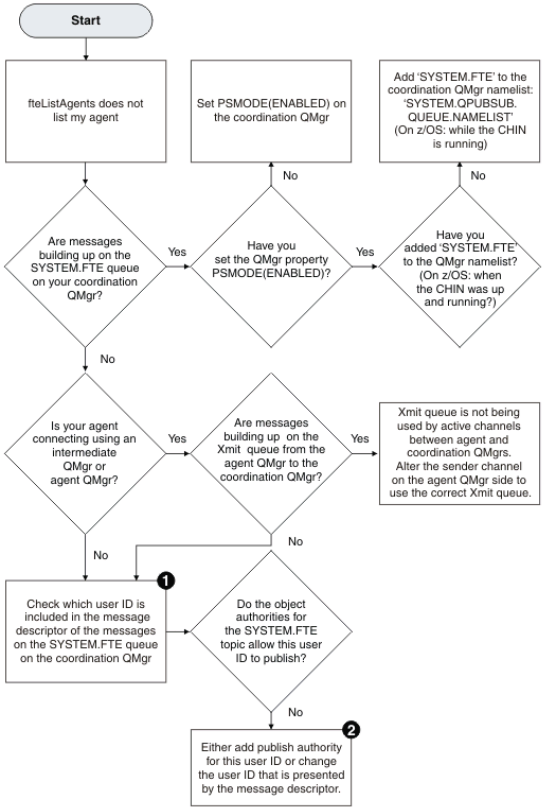
- Symptom
  - An agent, configured to monitors a directory, performs poorly when even a small number of files appear in the directory
- Cause
  - The agent has been configured to trigger when any file is found in a directory – when it triggers it has been configured to move every file in the directory (often this will result in moving the same file more than once!)
    - 1 file turns up in the directory = 1 file move
    - 2 files turn up in the directory = 4 file moves
    - 10 files turn up in the directory = 100 file moves
    - Agent is performing n^2-n more operations than necessary!
- Solution
  - To get the intended behaviour you want to monitor for '*' and transfer 'the file that matched the monitor condition'
    - Do this by specifying '${FilePath}' as the name of the file to move
    - You can also start the fteCreateMonitor command using –bs #. If you had 1,000 files, and you issued fteCreateMonitor –bs 50, it would move the files in 20 batches of 50 files.
    - As of 7.0.2.1 the MQ Explorer will display a warning if you specify a monitor containing a wildcard – and request to transfer a wildcard

Common Gotcha's
#3 Character set conversion

- Symptom:
  - Text transfers (i.e. those that perform code page conversion) fail with error messages citing unsupported character sets (e.g. BFGIO0058E or BFGIO0059E) when transferring between heterogeneous systems
- Cause
  - Little known facts:
    - All code page conversion, for a transfer, is done at the destination agent
    - Different platforms JVM's ship with different code page support!
  - This means that the source agent can be running in code page cp123 but the destination agent doesn't know what this code page is when it tries to perform the conversion
- Solutions
  - This problem can often be avoided by careful selection of code pages
  - It is possible to programmatically extend the code page support of an agent

Common Gotcha's
#4 My agent is not listed by fteListAgents or MQ Explorer

- Symptom:
  - fteListAgents or MQ Explorer does not display an agent
- Cause:
  - Actually this is several gotcha's in one!
    - Typically a messaging setup problem
- Solution:
  - See fault finding guide in information center:
- http://publib.boulder.ibm.com/infocenter/wmqfte/v7r0/topic/com.ibm.wmqfte.doc/list_agents_pd.htm



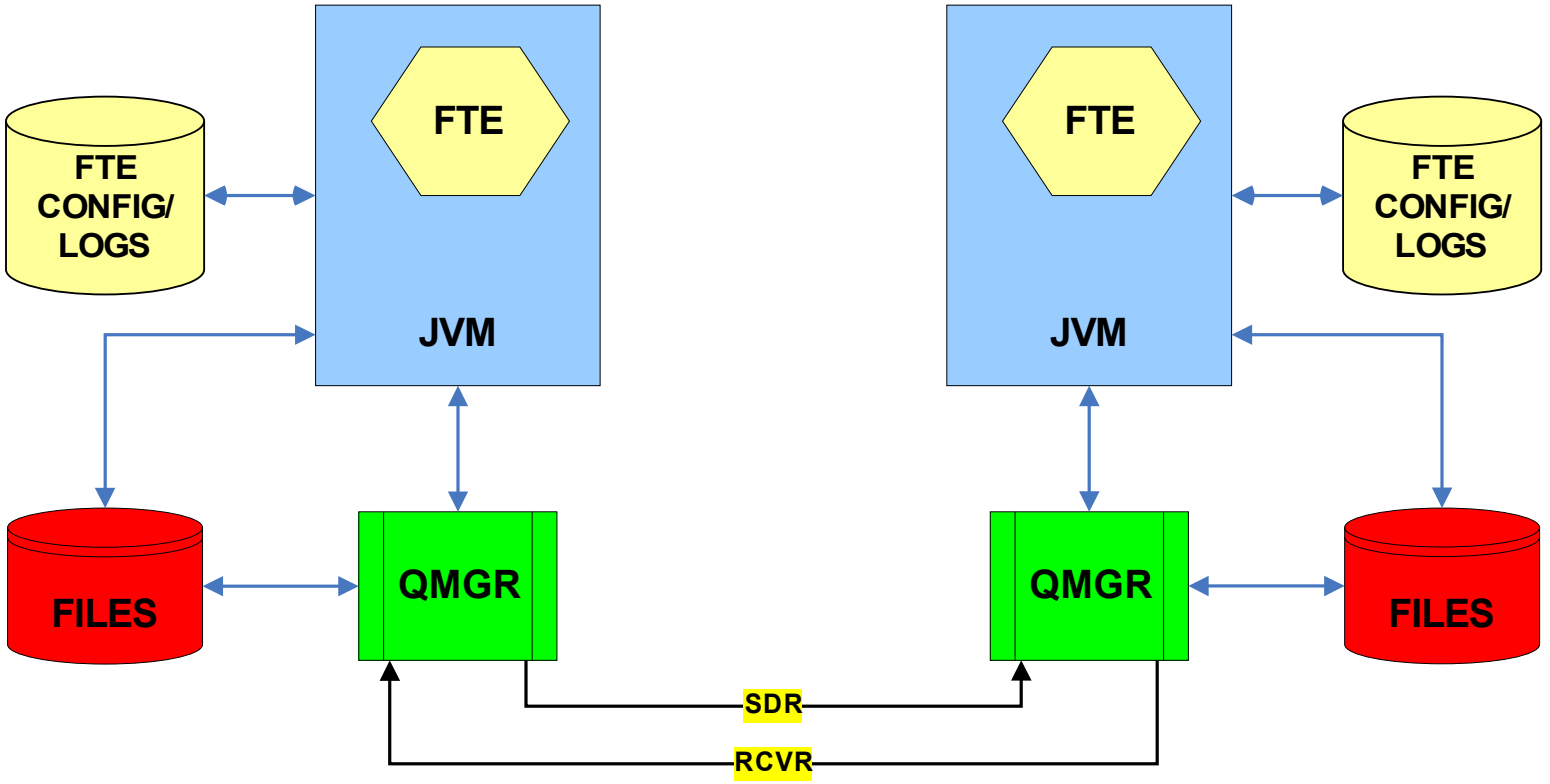
Common Gotcha's
#5 MQ Explorer plug-in doesn't get updated

- Symptom
  - The MQ Explorer plug-in doesn't appear to be updated after applying service (e.g. a fixpac) to an existing FTE install
    - If you click on the "Managed File Transfer" item in the Navigation frame the panel displayed in the Content frame has a version number in the bottom right hand corner
- Cause
  - The underlying technology (Eclipse) used by MQ Explorer requires a refresh command to be issued to make it "notice" updates to plug-ins
- Solution
  - Issue the "strmqcfg –i" command. This causes MQ Explorer to refresh its cache of plug-ins and "notice" any changes

Common Gotcha's
#6 Not checking the "system requirements"

- Symptoms:
  - FTE not installing
  - Not receiving service for a FTE configuration
  - Database Logger not working
- Cause:
  - FTE is being used in an unsupported, un-tested and (possibly) known not to work configuration
- Solution:
  - Prevention is the best cure
  - See http://www-01.ibm.com/software/integration/wmq/filetransfer/requirements/
    - Be especially careful of the Database Logger component

Health Check



Health Check

- User ids
  - Less than 12 characters
  - Exist on all required systems
  - Members of all necessary groups
- Filesystems
  - Have sufficient space for
    - Configuration, log and trace files
    - QMGRS
    - Current and future message traffic
    - Destination files

Health Check

- Filesystems continued
  - Appropriate permissions for FTE user ids on files and directories
- Memory
  - Sufficient shared memory structures for MQ
    - mqconfig.sh will show the bare minimum requirements for a lightly loaded qmgr. You may need a lot more.

http://www-01.ibm.com/support/docview.wss?uid=swg21271236

  - For Unix type platforms: ulimit -m 1048576 (or approximately 1 GB). This maximum resident set size allows for 25 concurrent transfers.
  - For all platforms: set FTE_JVM_PROPERTIES="-Xmx1024M"

Health Check

- MQ
  - Monitor channel status
  - Monitor queue depths
  - Monitor network status
  - Use queue profiles to set authorizations
  - Check authorizations for FTE user ids
    - dspmqaut –m QMGR –t qmgr –g group
    - dspmqaut –m QMGR –t q –n profile –g group

Hints and Tips

- Become familiar with this section of the Information Center:

http://publib.boulder.ibm.com/infocenter/wmqfte/v7r0/topic/com.ibm.wmqfte.doc/troubleshooting_general.htm

- When you open a PMR:
  - Always send a zip file of the config directory
  - Send QMGR error logs and FDC files
  - Send a very detailed description of what you did and what happened
  - Include a description of any and all recent changes
- Remember: Prevention is better than a PMR

Additional WebSphere Product Resources

- Learn about upcoming WebSphere Support Technical Exchange webcasts, and access previously recorded presentations at:
  http://www.ibm.com/software/websphere/support/supp_tech.html
- Discover the latest trends in WebSphere Technology and implementation, participate in technically-focused briefings, webcasts and podcasts at:
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- Join the Global WebSphere Community:
  http://www.websphereusergroup.org
- Access key product show-me demos and tutorials by visiting IBM Education Assistant:
  http://www.ibm.com/software/info/education/assistant
- View a webcast replay with step-by-step instructions for using the Service Request (SR) tool for submitting problems electronically:
  http://www.ibm.com/software/websphere/support/d2w.html
- Sign up to receive weekly technical My Notifications emails:
  http://www.ibm.com/software/support/einfo.html

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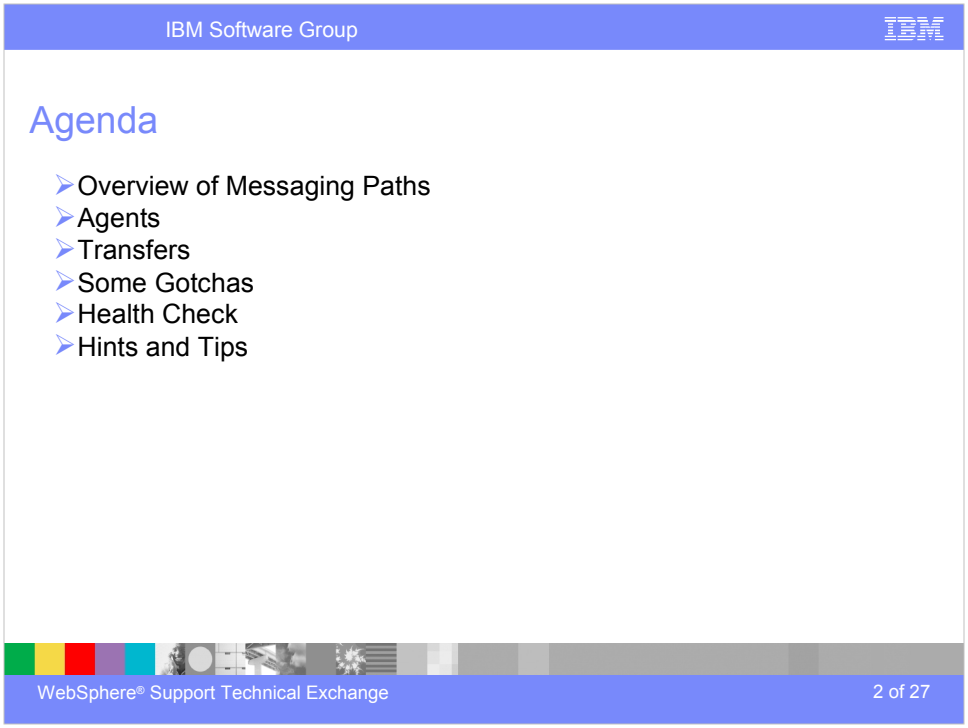
Questions and Answers

Today I will go over some of the basics of troubleshooting MQFTE.

I am planning on a follow up presentation to cover the areas that I didn't have time for in this one.

NEXT SLIDE



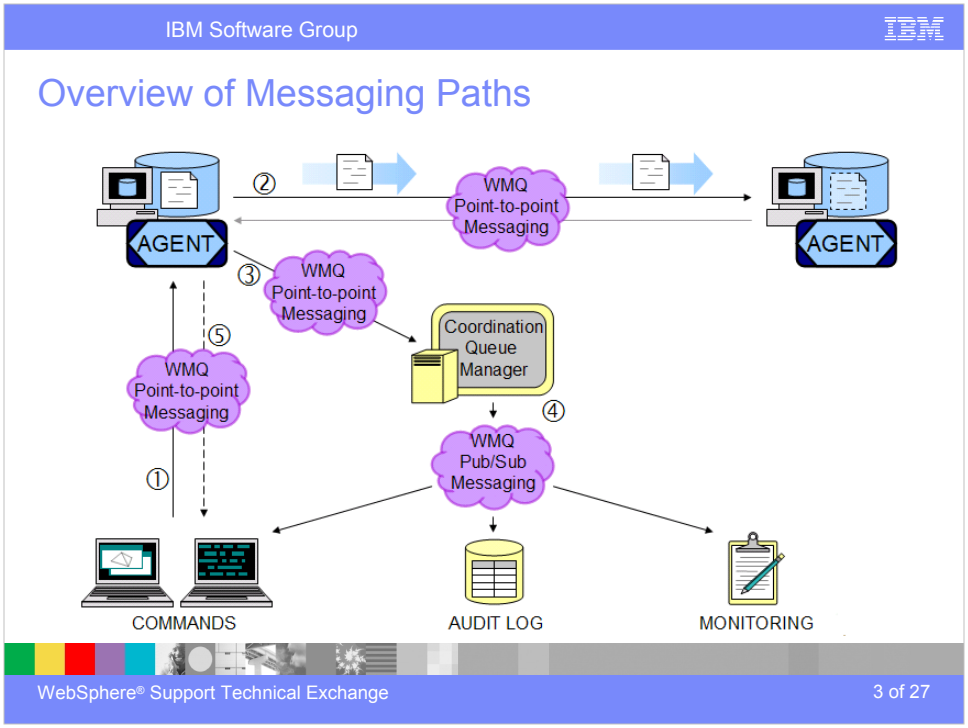
I will review the path a message takes.

Problems and solutions with agents and file transfers

I also borrowed some slides on gotcha's from a Level 3 presentation that you may find very useful.

Health check will cover some steps that will help prevent problems.

SLIDE 3



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Step 2: based on the instructions in the message, the agent performs some checking (is this user allowed to do this?) and then starts transferring a file to the destination agent. The file data is transmitted by packaging it as MQ messages and routing it through the MQ network to the destination agent which re-assembles the data into a file. There will be acknowledgements sent from the destination qmgr as needed.

Step 3: while the transfer (step 2) is progressing the agent is also generating both monitoring and audit information. Example monitoring information would be: “I’m 10% through the transfer… I’m 20% through…”. Example audit information would be “transfer of file ‘xyz.txt’ has completed for user ‘bill’ with a cryptographic hash of 1234”. This audit information is sent using MQ messages to a queue manager which has been designated as performing the “coordination” queue manager role

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SLIDE 4

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This slide provides notes on the messaging paths.

SLIDE 5

Agents – Won't Start

What to check

- Log files
  - output0.log
  - stderr.out
  - ffdc
- Filesystem
  - Unix®
    - df –k FTE_PARTITION
    - ls –laR
- Windows®
  - Check with Windows Explorer

The first problem I want to cover is when an agent wont start.

There can be several possible causes. Rather than try to cover each one, I want show you the fastest way to find the problem.

Your best first place to look is the agent log files. If there is a stderr file, it will have important information. These files only exist when a problem occurs during the start up process.

Ouput0.log will normally have what you want.

If there are any ffdc files, they may have helpful information as well.

During the start up process, FTE does a couple of things:

Puts the PID in agent.lck

Reads some of the properties files.

To do these things, there must be freee space on disk, and the user needs to have permissions to read the properties files.

You can also check the status of the agent using the plug-in in MQ Explorer

NEXT SLIDE

Agents – Won't Start

What to Check continued-

- Agent qmgr status can be determined by
  - MQ Explorer
  - runmqsc QMGR
  - dspmq
- System Resources
  - Consult with System Administrator on how to check
    - CPU
    - Memory
    - Disk space

You can also check the agent qmgr using

•MQ Explorer

•Runmqsc

•Dspmq

A lack of system resources is another possible cause. Check with your system administrator.

NEXT SLIDE

Agents - Hung

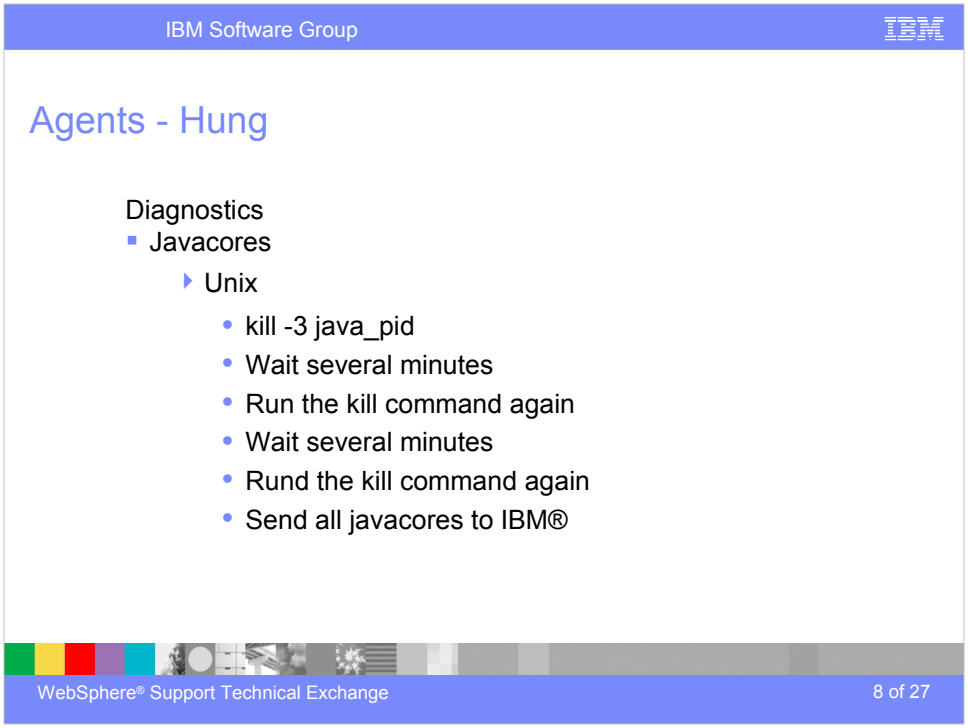
Possible Causes
- Default heap size not big enough
- Other

What to check
- Log files
- ffdc files
- System Resources

If the default heap size is too small, an FTE agent, like any Java application, can be at risk of becoming hung.

Again, the first place to check is the agent log files, and then system resources.

NEXT SLIDE



If checking the agent log files, and the system resources doesn't provide an answer, the next best choice

is to generate javacore files. These files dump all the processes that were running in the JVM when the agent hung, and make it easier to determine what happened.

You can send the javacores to IBM, or you can use the tool on alphaworks to analyze it yourself.

When you create javacore files, it is best to create three, with a gap of a few minutes in between. Doing so allows you to compare the javacore files to see which processes are hung.

The gap should be between 2 minutes and 10 minutes, whatever works best for your environment.

NEXT SLIDE

Agents - Hung

Javacores

- Windows
  - Run the agent process in the foreground.
  - fteStartAgent –F Agent
  - Enter the Ctrl+Break key sequence
  - Wait a few minutes, then create another javacore file

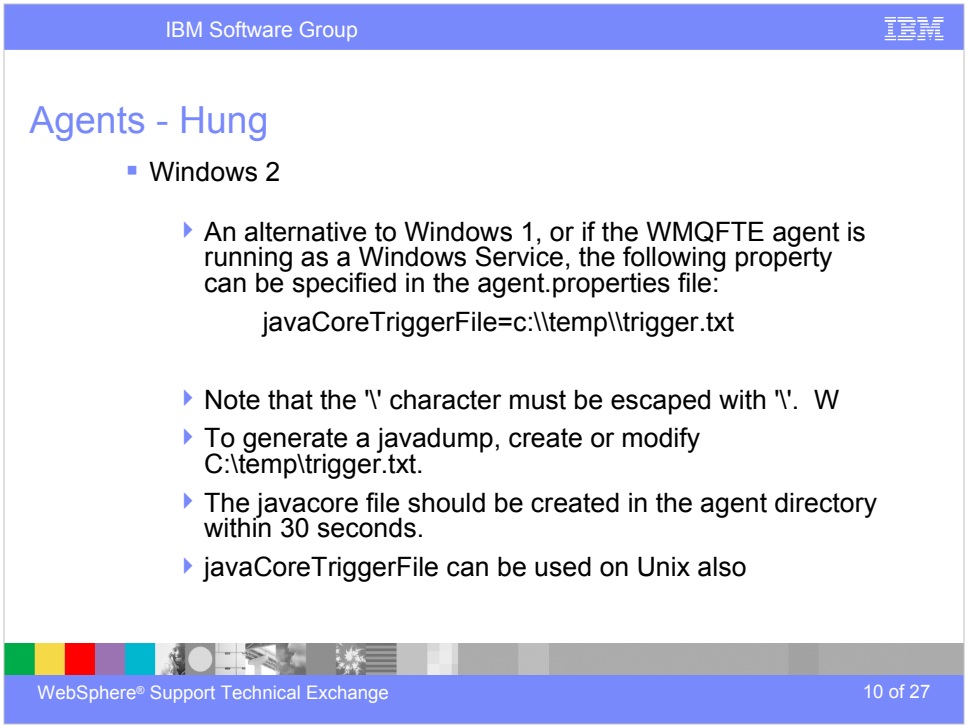
On Windows, Javacores are a little harder to create. There are two ways to obtain them, we will start with the least desirable method.

You will need to stop the agent, and then start it again in the foreground from a command prompt.

Now you will need to wait for it to hang again. When it does, issue Ctrl+Break in that command prompt window where you started the agent. The javacore file should be created in whatever directory you were in when you started the agent.

Now, lets look at the best way to get a javacore in windows.

NEXT SLIDE



This method requires planning.

You will need to put the javaCoreTriggerFile variable into the agent.properties file, and then restart the agent.

If your agent becomes hung, after making this change, you can simply create the file specified and the javacore will be created within 30 seconds.

Check the agent directory for the javacore file.

NEXT SLIDE

Transfers – Failed

Possibilities
- Part of the message path is unavailable
- Permissions
- System Resources

What to check
- Transfer status in MQ Explorer
- MQ Channel Status
- Is the remote agent running?
- UserSandboxes.xml
- Receiving filesystem permissions and free space
- Log files for both sending and receiving agents

Let's discuss a transfer failure. Again, my approach is to provide you with tools instead of a specific list of problems and solutions.

Remember the messaging paths we discussed at the begininig of the presentation? If any part of that path is unavailble, for any reason, a transfer may fail.

If a user id does not have sufficient permissions to access a queue, or queue manager, the transfer can fail.

If there is an underlying disk problem, or a system is running out of memory, or the CPU is bogged down in other requests a qmgr might be unavailable.

Checking the transfer status in MQ Explorer is a good place to start.

A channel that is not in RUNNING or quiesced state, or whose XMITQ is not triggered, will stop a file from traveling through the MQ network.

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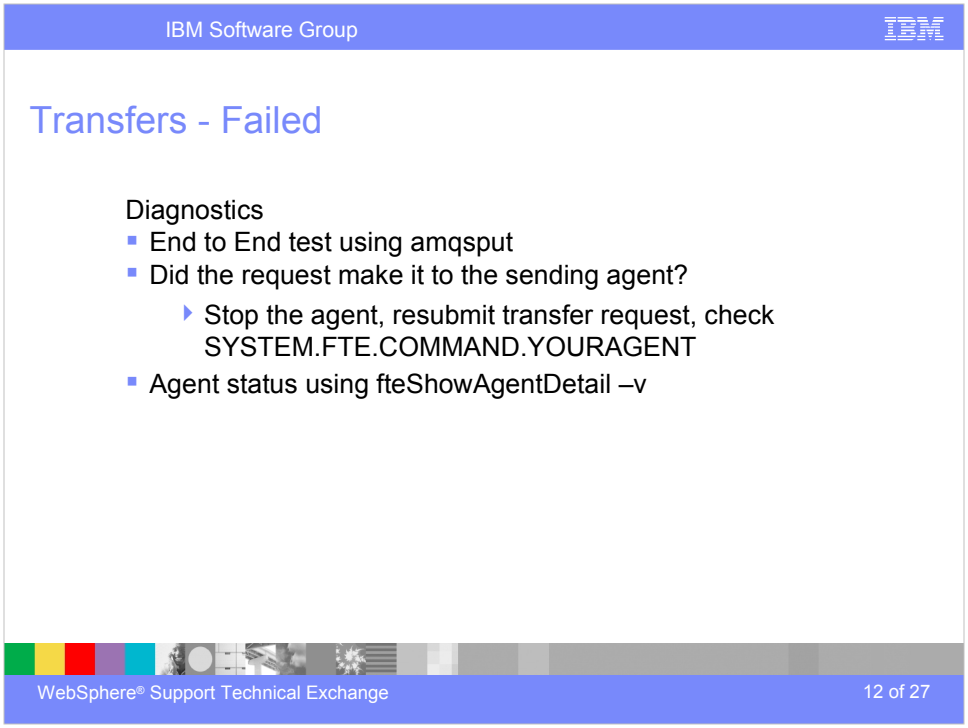

A valuable test to configure is a round trip test. Using a series of remote queues, you can put a message that will travel from one end to the other and back again.

You can configure it to start every channel. If it doesn't make it back, check channel status on each qmgr and you will find the source of the problem.

The next test, stopping the agent, submitting the request, then checking the command queue, will tell you if there is a problem with accessing the local qmgr.

The fteshowagentdetail command, with the –v option, provides extensive information about the agent.

NEXT SLIDE

Transfer - Failed

- Trace the agent
  - Enable trace on the running agent
    - fteSetAgentTraceLevel –traceagent =all Agent
  - Resubmit the transfer
  - Disable the trace after failure occurs
    - fteSetAgentTraceLevel –traceagent =off Agent

As a last resort, enable trace on the agent.

You can stop the agent, and then start it with the trace option, or you can turn it on dynamically while the agent is running.

You can also disable trace while the agent is running.

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Common Gotcha's
#1 User name problems

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    - 12 characters or less
  - Use MQ samples, or MQ Explorer to generate test messages (while running as a particular user ID)
    - Check the progress of the test message through the system – is it DLQ'ed?

While preparing for this presentation I found another presentation that listed some "gotcha's". I have included them for your benefit without modification.

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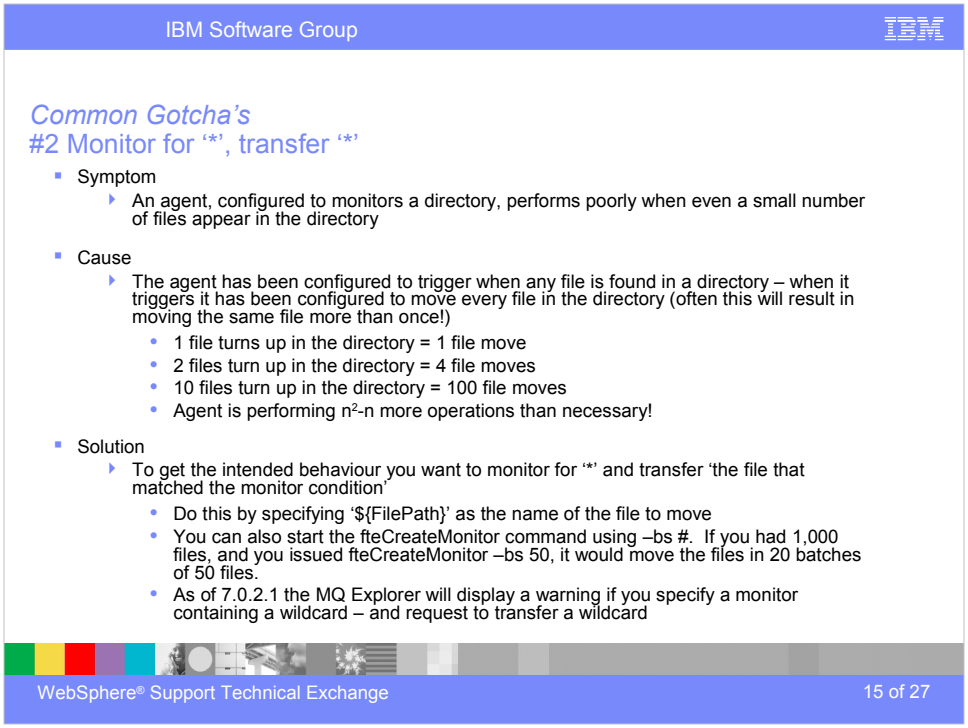

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Another solution is to use batches.

use the batch size (-bs) parameter for the fteCreateMonitor command (when creating the monitor). So for example, if there are 1000 files in the monitored folder and the monitor was created with -bs 50, it would cause the monitor to transfer 50 files at a time over 20 batches.

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Common Gotcha's
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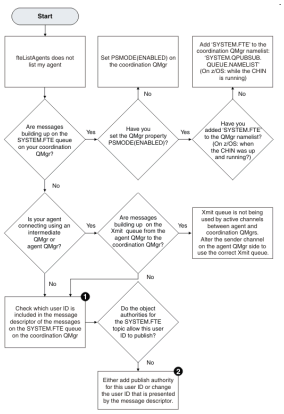

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Become familiar with the chart.

NEXT SLIDE

Common Gotcha's
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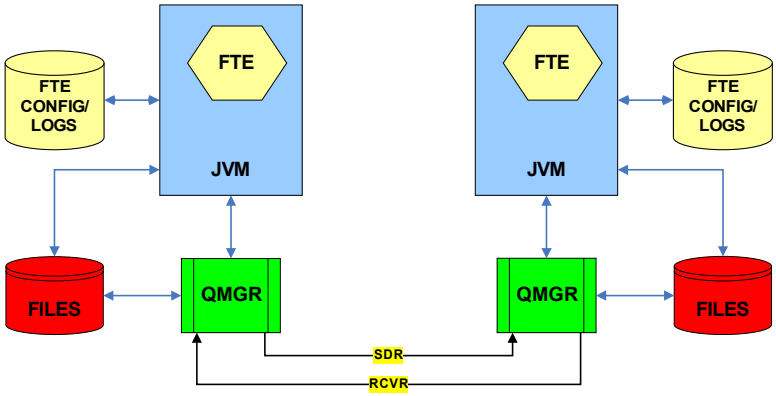
Health Check



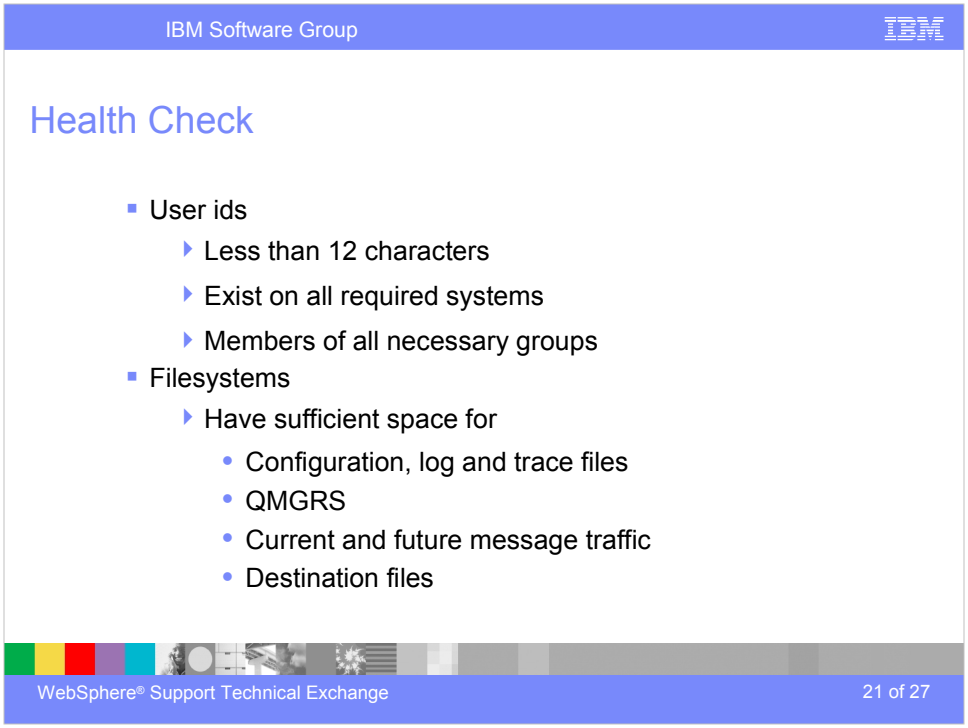
This slide represents the basic parts of an MQFTE network. The qmgrs represent any of the three.

When problems occur, it is often helpful to know where in the network the problem happened, and then to focus troubleshooting efforts there.

My purpose in the next few slides is to share some steps that may prevent problems in your MQFTE network.

First, I want to point out that the FTE agent, as all Java programs, runs in a JVM and communicates only with the JVM. Sometimes this matters during troubleshooting.

NEXT SLIDE



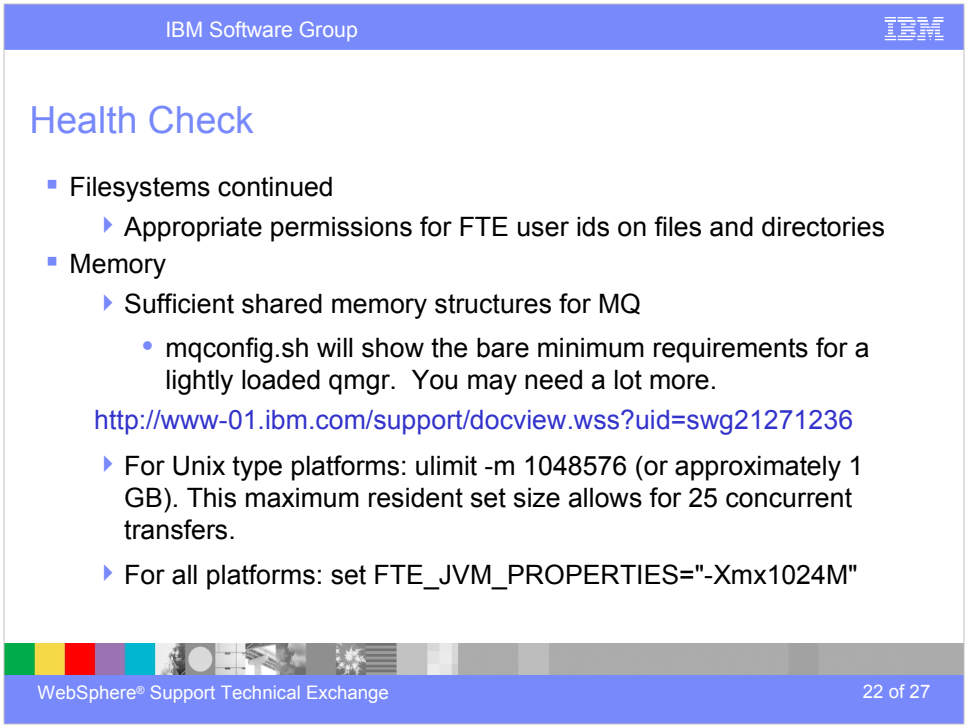
Sometimes when LDAP is used, email addresses, which exceed 12 characters, are used for ID's.

Many PMR's are opened because of userids that don't exist where they should. Make sure that all of the userids that might be needed, exist on all systems.

Userids need to have group memberships as well. Be aware that the primary group may not be present in the /etc/group file.

Planning how much space you will need for your filesystems is very important. With FTE, you need to consider that any file will exist, in part, on both the MQ filesystem, and wherever the final destination directory is located. Once you have estimated the space required, double it.

NEXT SLIDE



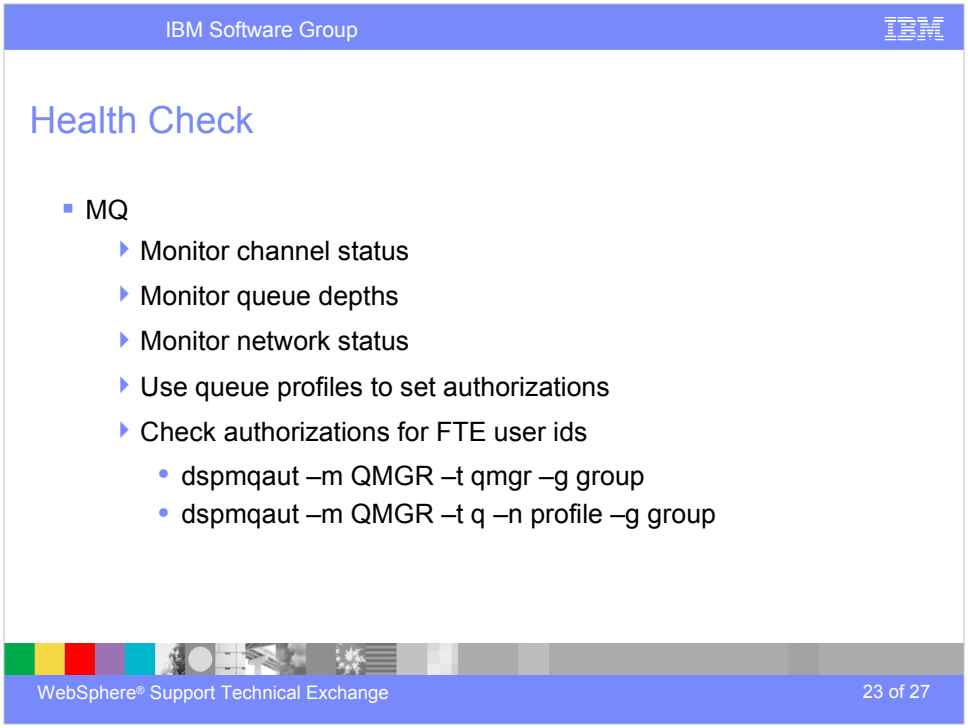
If the user that the JVM is running under does not have access to the directory where files originate from, or are written to, the transfer will fail.

The JVM will need a certain amount of heap space to run efficiently.

MQ will need a certain amount of shared memory segments, and so forth. Realize that kernel settings began in the days when memory was far more limited than today.

The instructions in the Quick Beginings manual are designed for one lightly loaded qmgr, They do not allow for databases or other applications.

You should feel free to increase them as much as your system will permit.



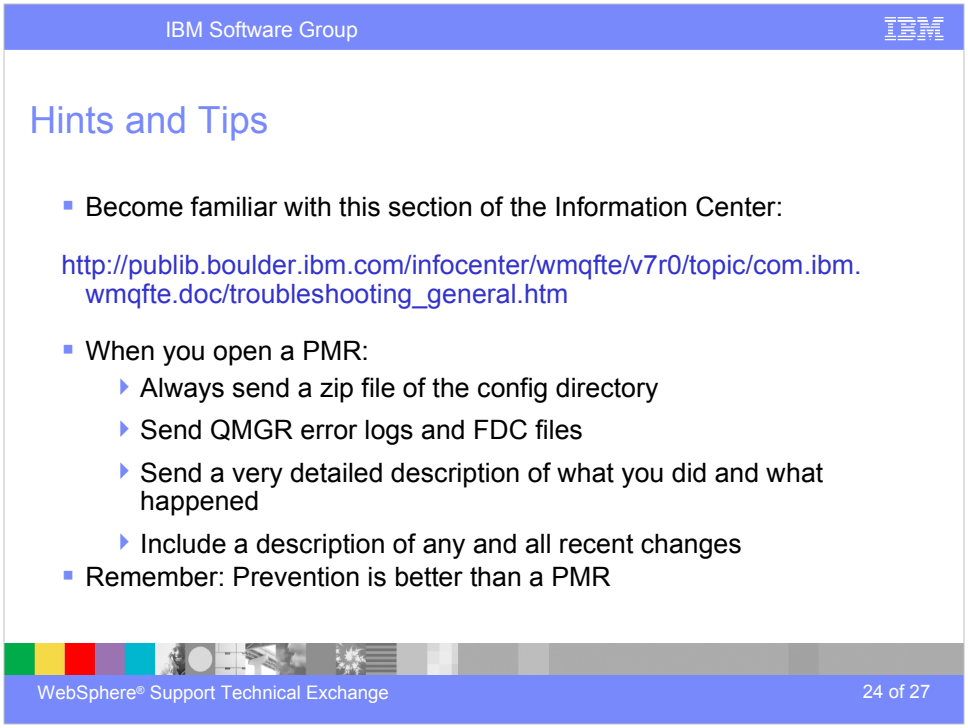
A really good thing to do is to set up scripts, or purchase a tool, that will monitor your MQ network.

You need to know when a channel changes to some status other than RUNNING or quiesced.

Monitoring queue depths, including dead letter queues, can alert you to problems as well.

It is important that any userid that FTE uses to access a queue or a qmgr, have sufficient rights to do so. Use dspmqaut and setmqaut to ensure that they do.

NEXT SLIDE



The troubleshooting section of the FTE Information Center has a lot of useful information, study it.

When you open a PMR for FTE, make it a habit to send a zip or tar of the config directory and everything below it.

Also, keep in mind that FTE runs on top of MQ and that you might need to send:

FDC's and qmgr error log files

I cannot overemphasize how important it is to provide a very detailed description of the problem. This will save more time than you can possibly imagine.

Finally, memorize this: PREVENTION IS BETTER THAN A PMR.

TURN TIME BACK TO JOSEPH.

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