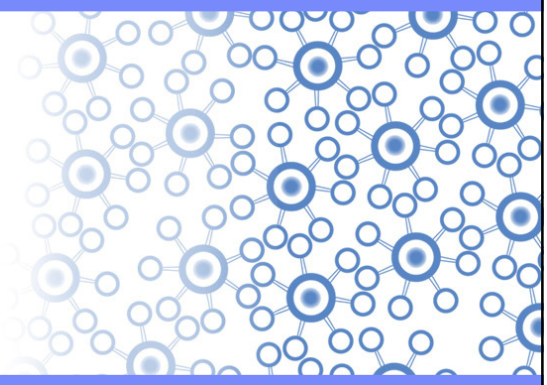
IBM
"Wildfire" Workshops

WMQ FTE Topologies and Configuration



Advanced Technical Skills

Lyn Elkins – elkinsc@us.ibm.com
Gene Kuehlthau - ekuehlth@us.ibm.com
Ed Zeilnhofer - edz@us.ibm.com
Mitch Johnson - mitchj@us.ibm.com

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Agenda

- Topology, Implementation and bridges
  - Topologies
  - Configuration
  - Administration of FTE environment.
  - Walkthrough of Key File Transfer Edition Function
  - Overview of messaging paths
  - Bridges
    - The Connect:Direct bridge
    - The protocol bridge
    - Working with WebSphere Message Broker
    - WebSphere DataPower B2B Appliance XB60
  - Web Gateway

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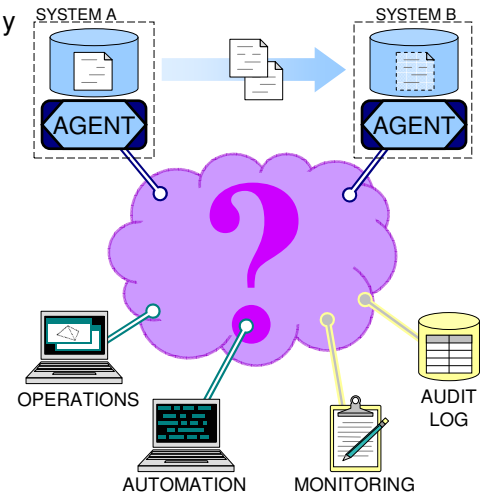
Topologies - Integration with MQ Networks

- How do I integrate this with my existing queue manager network?
  - Let's look at some examples…



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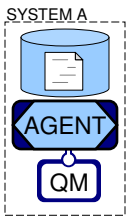
Connecting Agents to MQ

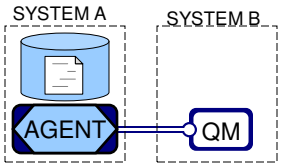
- On distributed platforms, agents can connect to MQ either directly, or using an *MQ Client* style connection
- z/OS agents can **only** connect via direct method.

Direct connection to MQ



Both agent and queue manager must run on the same machine

MQ Client style connection



Agent and queue manager can run on different machines, connected by a TCP/IP network

- When agents connect as clients:
  - **No** dependency on MQ client libraries
  - MQ "sees" the agent as a client

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Technical considerations when connecting agents

N O T E S

- Platform
- Performance
  - Connecting to a local queue manager offers the best performance
- Speed at which transfers can be restarted if connectivity is lost
- Impact to WebSphere MQ FTE processing
  - Processor capacity
  - File location

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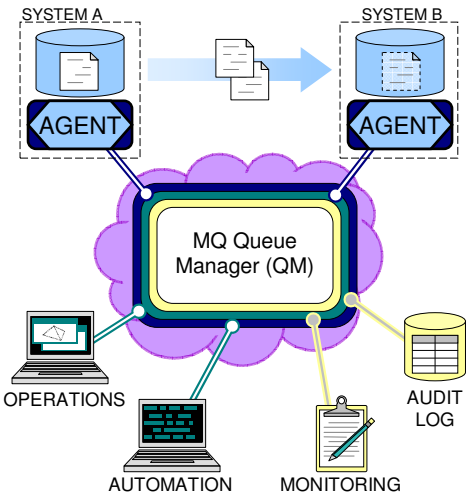
Integration with MQ Networks
A Single Queue Manager

- At one extreme, you can connect everything to a single queue manager…
  - Most useful for prototyping or test systems
- Here one queue manager is playing the following roles:
  - Agent queue manager (for the two agents)
  - Command queue manager (for the operation and automation commands)
  - Coordination queue manager (for the audit and monitoring processes)



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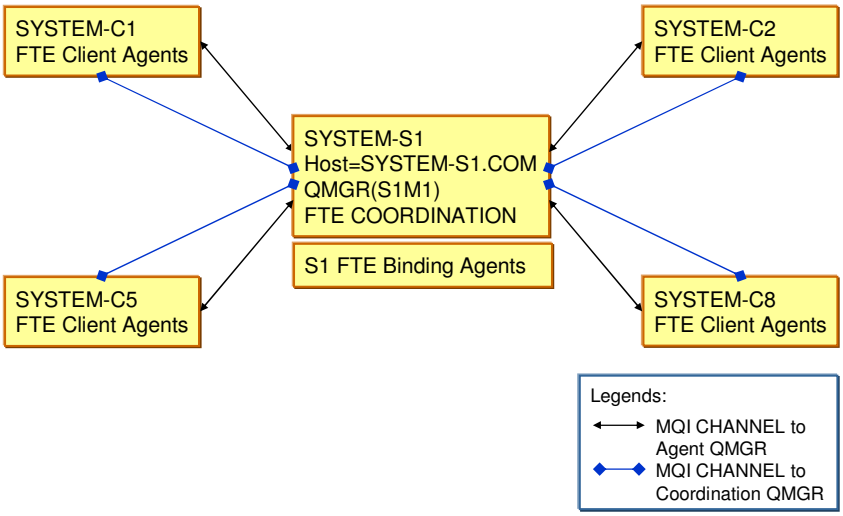
Single Queue Manager provides all FTE functions



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Single Queue Manager provides all FTE functions

N O T E S

Agent functions (Agent properties)

Command functions (Command properties)

Coordination function (Coordination properties)

The S1 FTE binding agents represent direct connected agents

The Cn FTE client agents represent client connected agents

Next slides show the Properties values both types of connections

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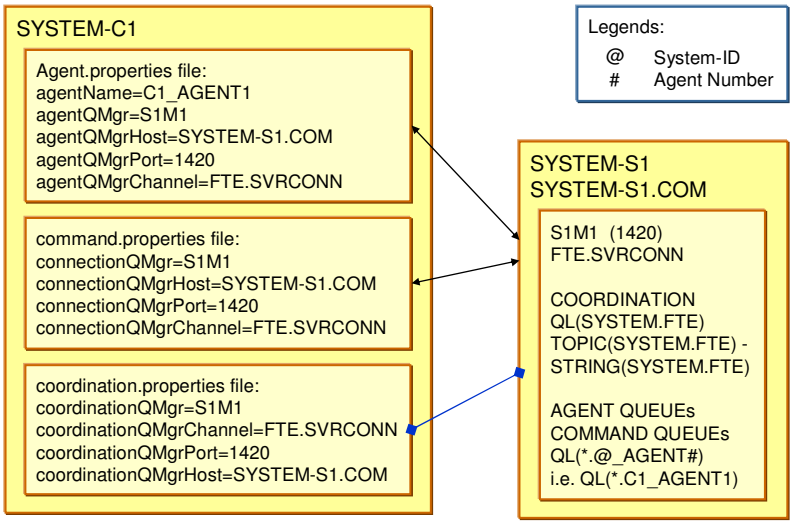
FTE Client Connection SYSTEM-C1 to SYSTEM-S1 Parameters



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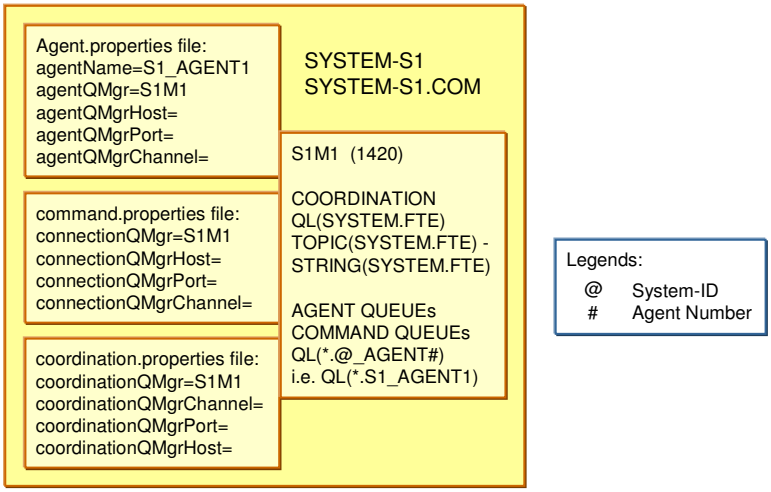
S1 FTE Binding Connection on SYSTEM-S1 Parameters



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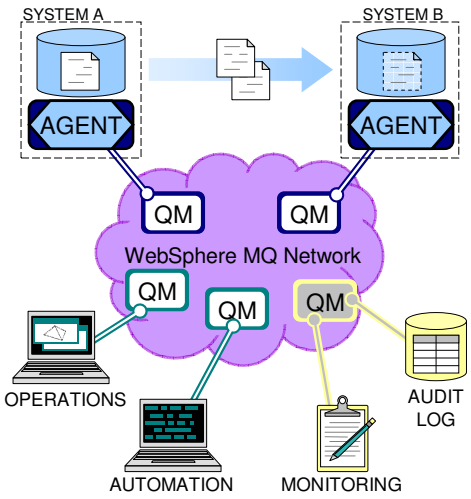
Integration with MQ Networks
Complex Configurations

- At the other extreme, you can have one or more queue managers dedicated to each role…
- Many agent queue managers
  - Each agent is associated with exactly one queue manager
  - One queue manager can host many agents
- Many command queue managers
  - Each instance of the commands is associated with exactly one queue manager
  - One queue manager can be used by many instances of the commands
- One coordination queue manager
  - Many monitoring / audit applications can use the coordination queue manager



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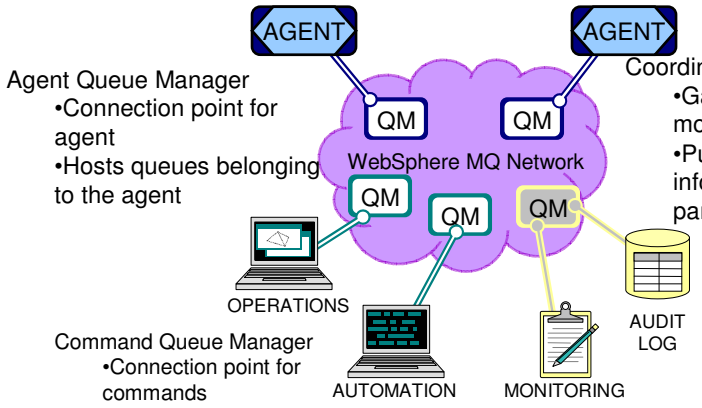
Recap: Queue Manager Roles



Agent Queue Manager
- Connection point for agent
- Hosts queues belonging to the agent

Coordination Queue Manager
- Gathers logging and monitoring information
- Publishes this information to interested parties

Command Queue Manager
- Connection point for commands

- An MQ queue manager can play between zero and all three of these roles!

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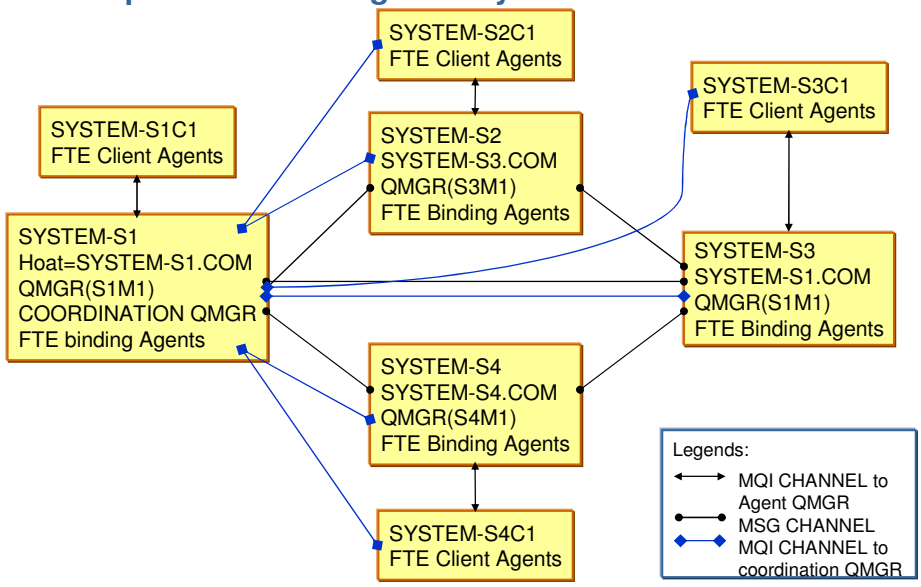
FTE Multiple Queue Managers only one coordination function



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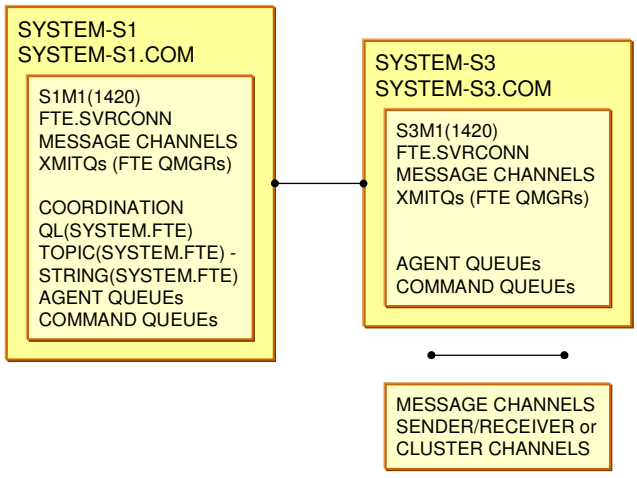
FTE WMQ SYSTEM-S1 to SYSTEM-S3



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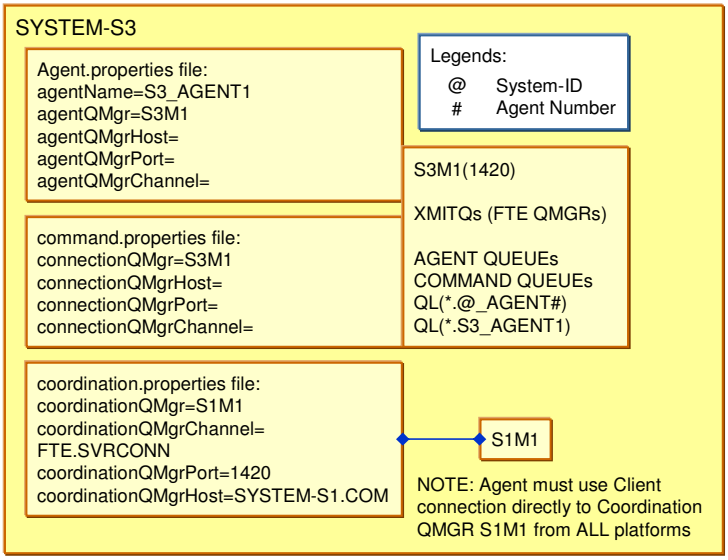
FTE Bindings Connection



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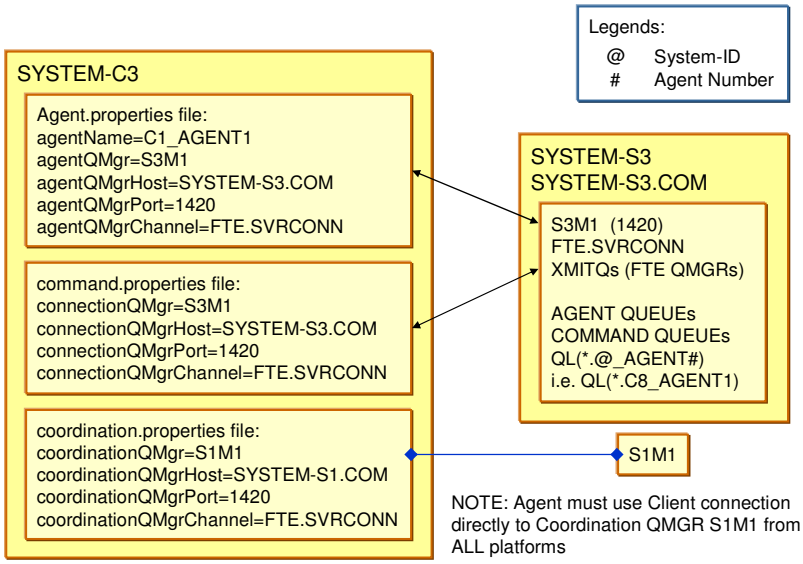
FTE Client Connection SYSTEM-S3C1 to SYSTEM-S3

Agent must use Client connection directly to Coordination QMGR S1M1



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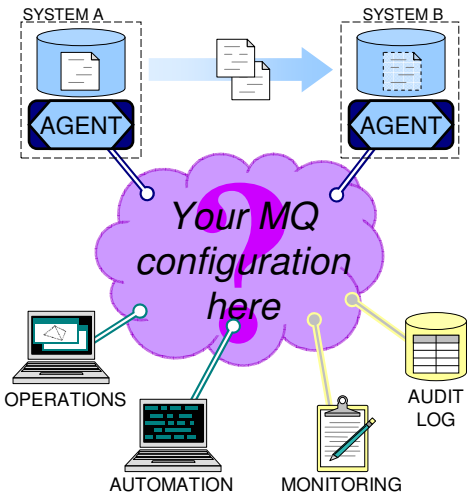
Integration with MQ Networks And My Current Network?

- File Transfer Edition integrates with existing MQ networks
- May need to add a coordination queue manager
- MQ V7 license comes as part of distributed File Transfer Edition Server product
- Protocols designed to minimize impact on existing messaging networks
- May create additional channels for FTE use.



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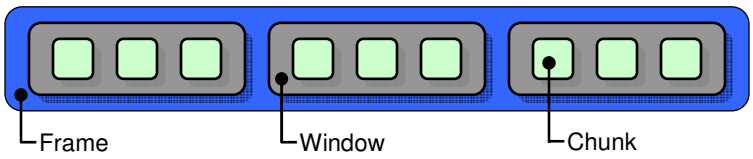
Tuning the Transfer Protocol

- The transfer protocol can be tuned by specifying agent properties:
  - Size of messages transmitted (chunks)
  - Frequency of acknowledgements and thus the amount of queued data (windows)
  - Point at which transmission is blocked until an acknowledgment is received (frames)
  - Frequency at which agent saves state (in frames)



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Tuning the Transfer Protocol

N O T E S

You can change WebSphere® MQ and WebSphere MQ File Transfer Edition properties to affect the behavior of WebSphere MQ File Transfer Edition when reading or writing messages of various sizes.

If the size of messages being read from a source queue or written to a destination queue exceeds 1048576 bytes (1MB), you must increase the value of the WebSphere MQ File Transfer Edition agent property maxInputOutputMessageLength to a value that is greater than or equal to the maximum message size to be read or written.

In addition to changing the maxInputOutputMessageLength agent property, you might also have to change some of the WebSphere MQ queue manager properties.

If the average size of the messages that the agent is reading from or writing to a queue is less than 1310 bytes and the agent is reading or writing more than 10000 messages, you must increase the maximum number of uncommitted messages property on the queue manager or reduce the amount of data in a checkpoint interval

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Configuration

- Configuration generates:
  - Configuration files on the local file system
  - MQ object definitions required by the agent
- FTE_CONFIG=/u/teamXX/WMQFTE (z/OS)
- Configuration commands:
  - fteSetupCoordination
  - fteSetupCommands
  - fteCreateAgent
  - fteDeleteAgent

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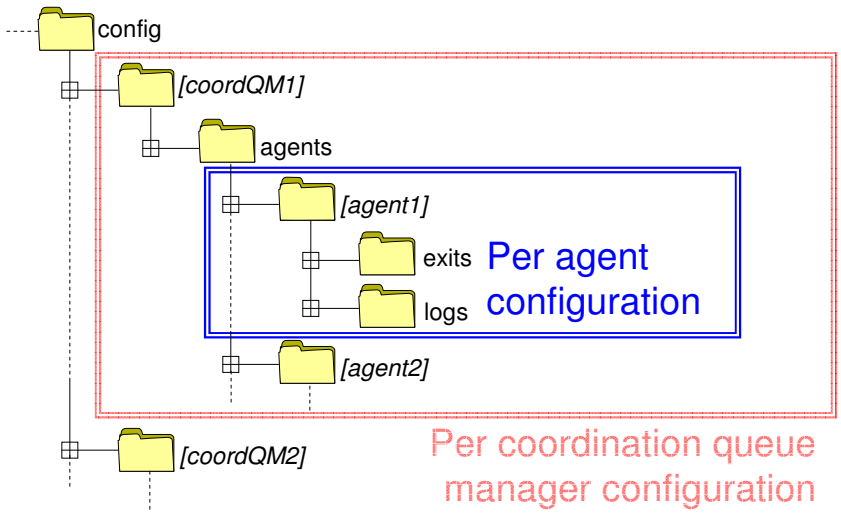
Configuration Directory Structure



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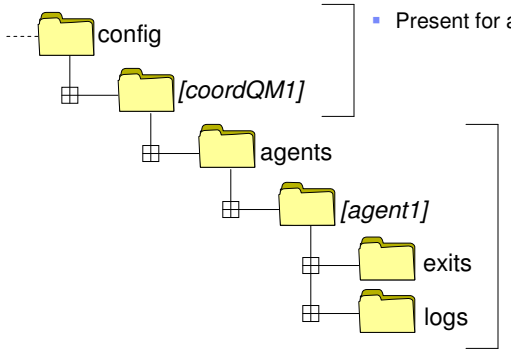
"Real World" Configuration



- Present for any type of install
- Present only if an agent is installed
- Typically only a single agent (or a single set of commands) would be present on a system

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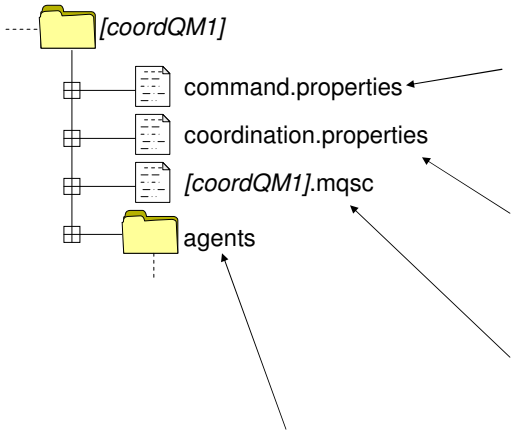
Coordination Level Configuration



Information required to connect to command queue manager. Used by commands.

Information required to connect to coordination queue manager. Used by monitoring / logging tools.

Used to define MQ resources required on coordination queue manager

Holds agent level configuration (as shown on next slide)

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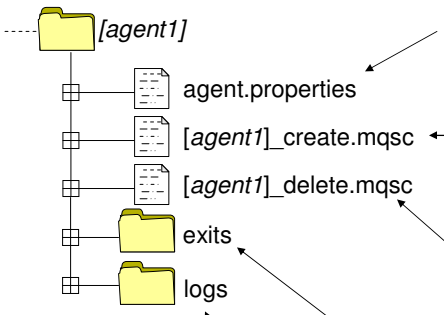
Agent Level Configuration



Information required to connect to the agent queue manager. Used by the agent

Used to define resources to the agent queue manager

Used to delete resources from the agent queue manager (this can be used if an agent is uninstalled)

User exit routines are placed here

Agent writes log files into this directory

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MQ Configuration Objects

- MQ agent Configuration queues
- MQ coordination Configuration objects
- MQ security Configuration queues
- DBlogger configuration queues
- Web agent operation queues

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MQ agent Configuration queues

- Agent queues needed five queues defining to the queue manager it connects to:
  - SYSTEM.FTE.COMMAND.*AGENT_NAME*
  - SYSTEM.FTE.STATE.*AGENT_NAME*
  - SYSTEM.FTE.EVENT.*AGENT_NAME*
  - SYSTEM.FTE.DATA.*AGENT_NAME*
  - SYSTEM.FTE.REPLY.*AGENT_NAME*
  - *SYSTEM.DEFAULT.MODEL.QUEUE*
- Embedding agent name into queue names allows multiple agents to use one queue manager
  - Drawback is that it imposes length and character-set restrictions on agent names
- Coordination queue manager also needs FTE specific queue and topic definitions

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MQ coordination Configuration objects

- TOPIC('SYSTEM.FTE') TOPICSTR('SYSTEM.FTE')
- QLOCAL(SYSTEM.FTE) LIKE(SYSTEM.BROKER.DEFAULT.STREAM)
- NAMELIST(SYSTEM.QPUBSUB.QUEUE.NAMELIST) +
- NAMES(SYSTEM.BROKER.DEFAULT.STREAM+
  ,SYSTEM.BROKER.ADMIN.STREAM,SYSTEM.FTE)
- ALTER QMGR PSMODE(ENABLED)

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MQ security Configuration queues

- SYSTEM.FTE.AUTHADM1.agent_name
- SYSTEM.FTE.AUTHAGT1.agent_name
- SYSTEM.FTE.AUTHMON1.agent_name
- SYSTEM.FTE.AUTHOPS1.agent_name
- SYSTEM.FTE.AUTHSCH1.agent_name
- SYSTEM.FTE.AUTHTRN1.agent_name
-

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MQ DBlogger and web agent queues

On Coordination queue manager

- QLOCAL(SYSTEM.FTE.DATABASELOGGER.REJECT)
- QLOCAL(SYSTEM.FTE.DATABASELOGGER.COMMAND)

On each Web agent queue managers

- SYSTEM.FTE.WEB.*gateway_name*
- SYSTEM.FTE.WEB.RESP.*agent_name*

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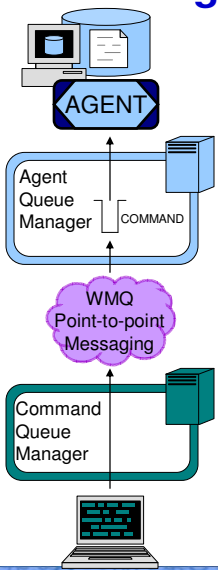
Instructing the Agent



- Agents instructed via messages sent to their command queue
  - This is regardless of whether the GUI, command line, or Ant scripts are used to start the transfer
- Supplied tools can send this via a nominated command queue manager
- Format of command message is documented (XML based)
  - Describes the files to send
  - Specifies the agent name and agent queue manager that will be the recipient

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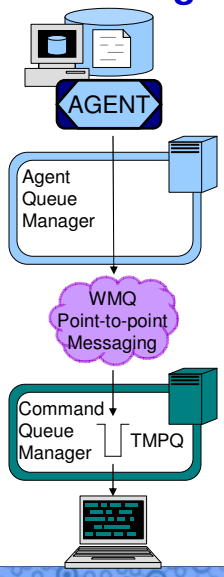
Instructing the Agent reply



- Command messages can specify a reply queue
  - Only applicable to new transfer request in 7.0.0
  - 7.0.1 extends this to a wider range of command messages

New to 7.0.1

- Standard MQ request / response pattern is used to reply
- Reply contains information about the outcome of the operation
- Used to implement *"block while transfer completes"* semantics for command line

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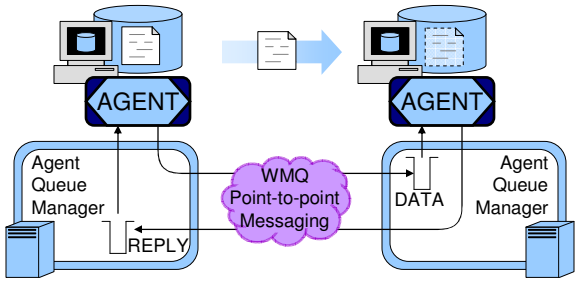
Transferring Files



- Transfers involve a two way flow of messages between agents
- Source agent sends data to 'data' queue of destination agent
- Destination agent sends replies to 'reply' queue of source agent

- File data is sent as non-persistent messages
  - Minimises impact on queue manager logs
  - Permits prioritization of file traffic alongside messaging traffic
  - But non-persistent messages can be discarded, so…
- Bi-directional flow of messages allows agents to:
  - Handle non-deliver of non-persistent messages
  - Manage pacing of file transfer (this can be tuned)

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FTE interconnecting bridges to other styles of data moving and other IBM products

- The Connect:Direct bridge
- The protocol bridge
- Working with WebSphere Message Broker
- WebSphere DataPower B2B Appliance XB60

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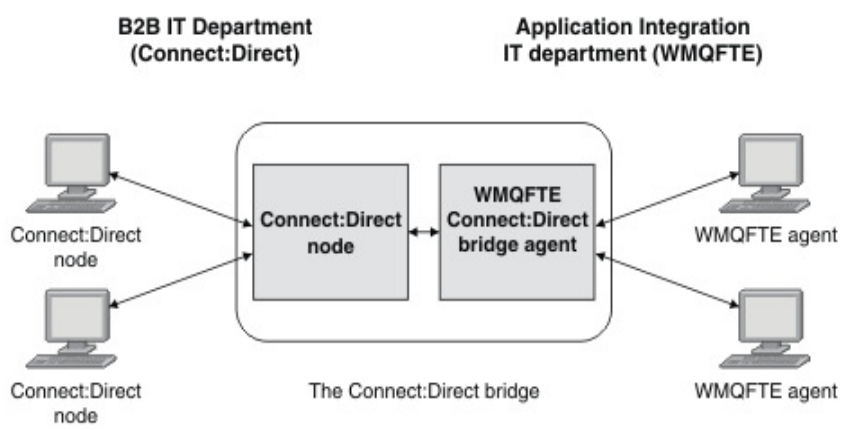
The Connect:Direct bridge



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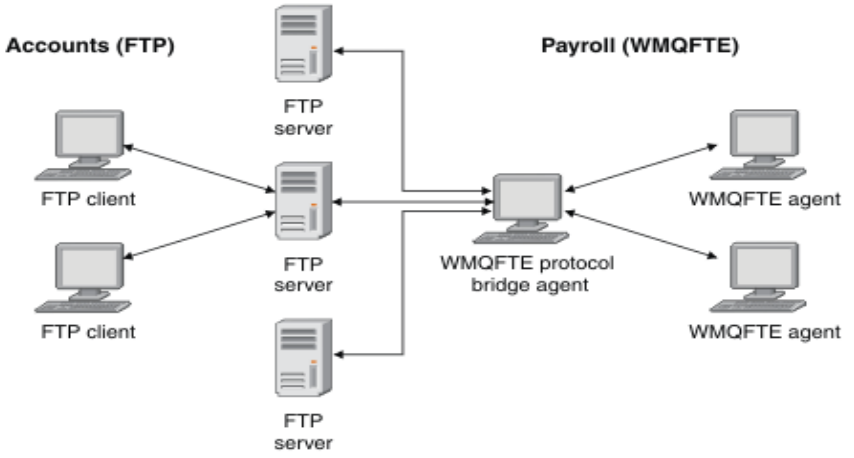
The protocol bridge



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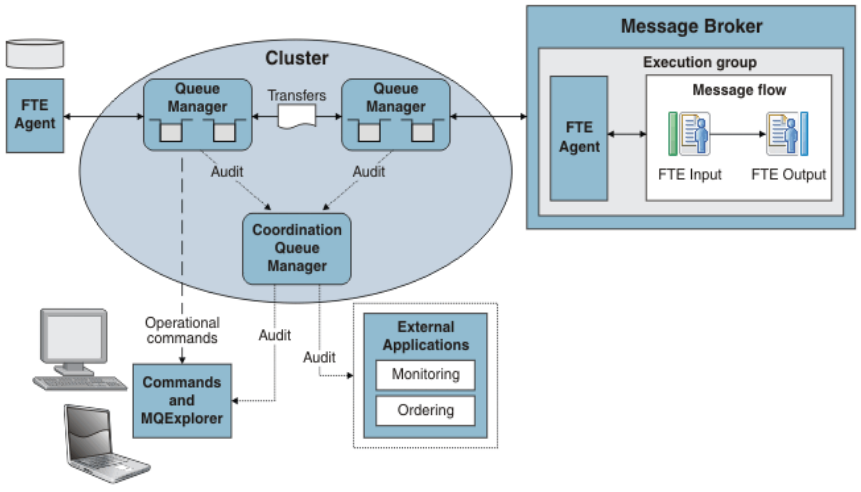
Working with WebSphere Message Broker



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Overview of using WebSphere MB File Transfer Edition nodes

- You do not need to configure the WebSphere MQ File Transfer Edition code that runs in the broker. Operational tools in WebSphere Message Broker Explorer are provided to create transfers. The following nodes are provided:
  - FTEOutput
  - FTEInput
- Take the following steps to use the nodes to send or receive data across an existing WebSphere MQ File Transfer Edition network:
  - Create a flow that includes one of the WebSphere MQ File Transfer Edition nodes.
  - Configure the node.
  - For production purposes, change the coordination queue manager from the broker queue manager; see Preparing the environment for WebSphere MQ File Transfer Edition nodes.Deploy the flow.

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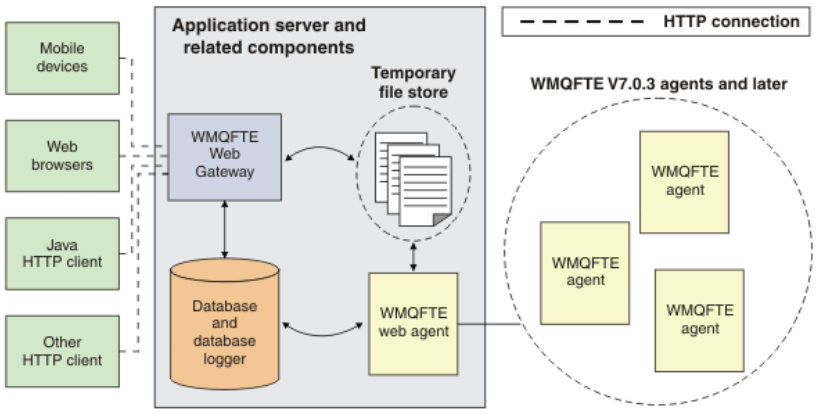
Web Gateway - to support clients that use the HTTP protocol.



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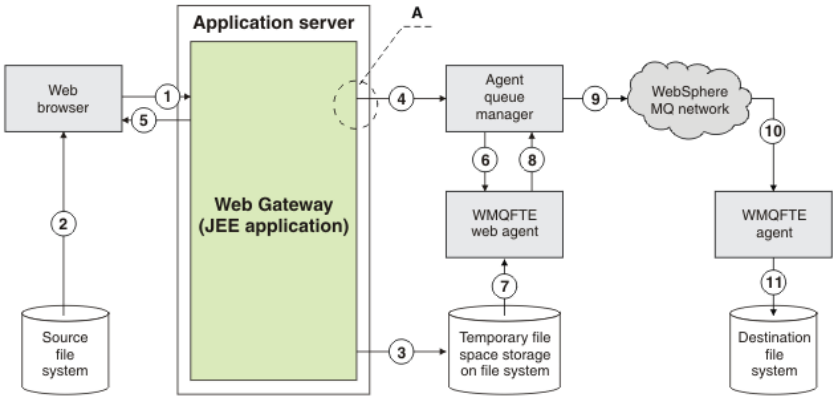
Web Gate Inbound flow description - RESTful API devices can use to up load file



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Web Gate flow description - note 1

N O T E S

1 A JavaScript application running in the user's web browser uses functions defined by the RESTful API provided by the Web Gateway to upload a file.

2 The file data is read from the file storage located on the same system as the web browser and sent using the HTTP protocol to the application server that hosts the Web Gateway application.

3 The Web Gateway Java Platform, Enterprise Edition (JEE) application receives the file data as the body of an HTTP request and writes it to file storage that is accessible from both the application server and the web agent. If the Web Gateway application and web agent are on the same system, this can be a directory on the system's file system.

4 The Web Gateway application sends a message to the agent queue manager to which the web agent is connected. This message contains instructions that identify both the file to move and the WebSphere MQ File Transfer Edition agent that the file data is sent to. This information is taken from the HTTP request in step 1.

5 The Web Gateway JEE application sends an HTTP response to the web browser.

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Web Gate flow description - note 2

N O T E S

6 The web agent receives the message that requests the transfer of the file data.

7 The web agent reads the file data, which corresponds to the uploaded file from step 1.

8 The web agent transfers the file data, as a sequence of messages, to the agent queue manager.

9 The agent queue manager transfers the messages, which correspond to the uploaded file from step 1, across the WebSphere MQ network. This might involve exchanging the file data between further queue managers until the data arrives at the queue manager to which the agent running on the destination system is connected.

10 The agent on the destination system receives the messages containing the file data and converts the data back into a file.

11 The file data is written to the file storage at the destination system.

A - JMS Queue called WMQFTEWebAgentRequestQueue with a JNDI name of jms/WMQFTEWebAgentRequestQueue

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WebSphere DataPower B2B Appliance XB60

- This sample has been developed to demonstrate a potential solution for a B2B scenario using WebSphere® MQ File Transfer Edition and WebSphere DataPower® B2B Appliance XB60.
- The sample provided demonstrates how a DataPower appliance can deal with an incoming request by routing a file onto an NFS mount and using WebSphere MQ File Transfer Edition to move that file between agents.

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Summary

- Topology & Implementation
  - Topologies
  - Configuration
  - Administration of FTE environment.
  - Walkthrough of Key File Transfer Edition Function
  - Overview of messaging paths

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