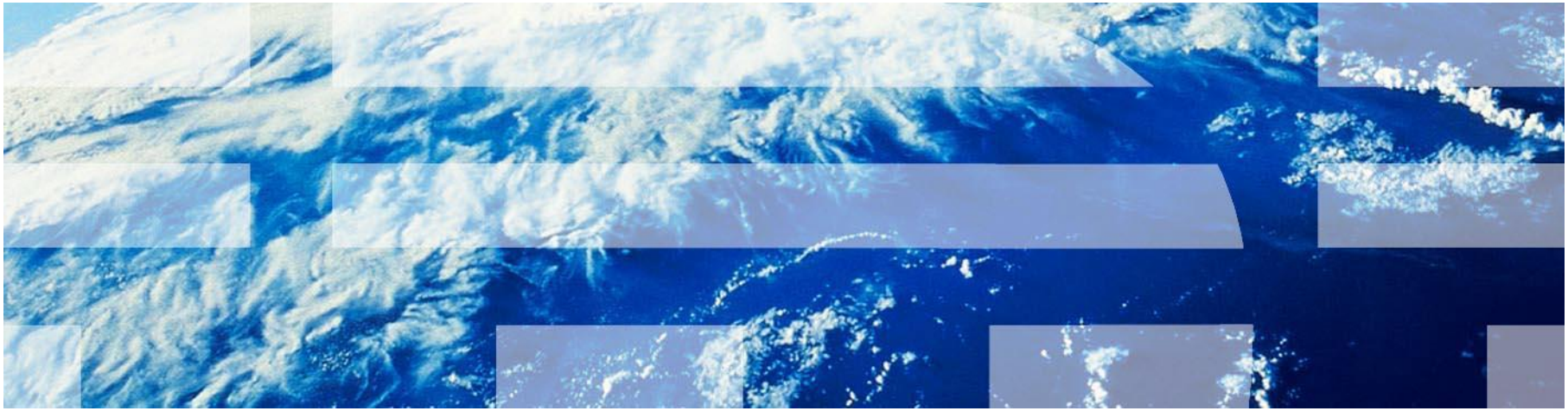
WebSphere MQ Managed File Transfer

Introduction to WebSphere MQ Managed File Transfer



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Agenda

- Common problems transferring file data
- Introduction to IBM® WebSphere® MQ Managed File Transfer
- IBM Managed File Transfer portfolio
- Key MQ Managed File Transfer concepts
- Usage scenarios for MQ Managed File Transfer

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IBM WebSphere MQ family

Portfolio of messaging capabilities optimized for a range of connectivity challenges

WebSphere MQ	for mission critical data
WebSphere MQ for z/OS	for IBM System z® investment
WebSphere MQ Managed File Transfer	**for managed file transfer**
WebSphere MQ Adv. Message Security	for maximum security
WebSphere MQ Telemetry	for sensors and devices
WebSphere MQ Low Latency	for high speed delivery

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How do most organizations move files today?

Most organizations rely on a mix of "home-grown" code, legacy products and different technologies and even different people!

- **FTP**
  - File Transfer Protocol (FTP) is usually combined with writing and maintaining home-grown code to address its limitations.
- **Why is FTP use so widespread?**
  - FTP is widely available – Lowest common denominator
  - Promises a quick fix – repent at leisure
  - Simple concepts – low technical skills needed to get started
  - FTP products seem "free," simple, intuitive and ubiquitous.
- **Legacy file transfer products**
  - A combination of products often used to provide silo solutions
  - Often based on proprietary versions of FTP protocol
  - Cannot transport other forms of data besides files
  - Usually well integrated with B2B but rarely able to work with the rest of the IT infrastructure – especially with SOA
- **People**
  - From IT staff to business staff and even security personnel
  - Using a combination of email, fax, phone, mail, memory keys, and more.

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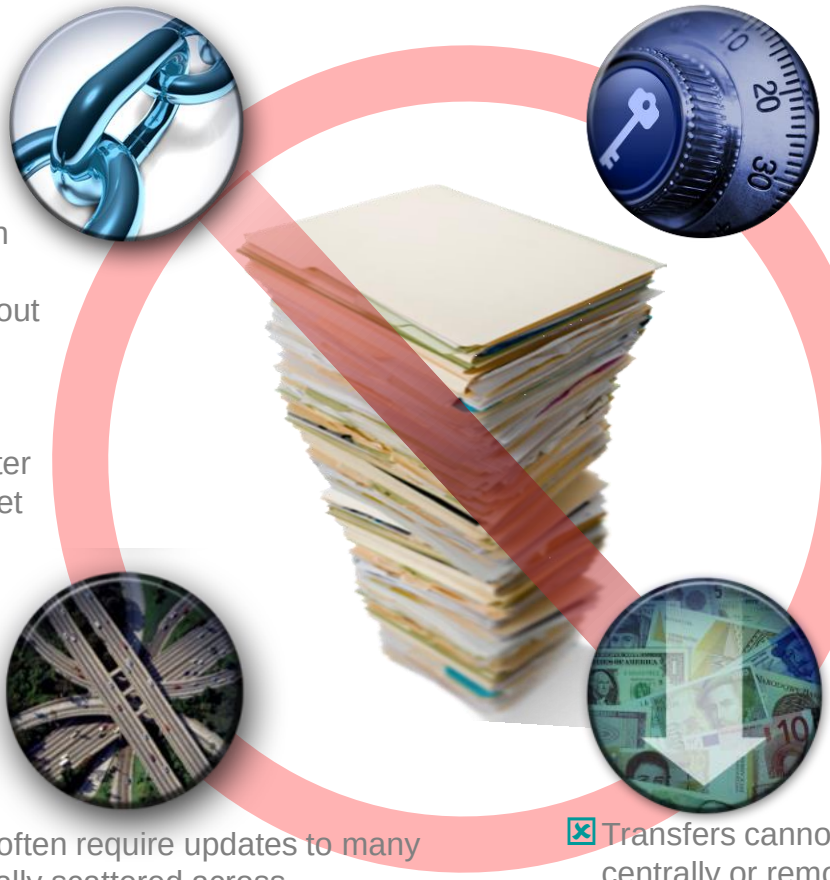
Shortcomings of basic FTP



Limited reliability

- Unreliable delivery – Lacking checkpoint restart – Files can be lost
- Transfers can terminate without notification or any record – corrupt or partial files can be accidentally used
- File data can be unusable after transfer – lack of character set conversion

Limited security

- Often usernames and passwords are sent with file – as plain text!
- Privacy, authentication and encryption often not be available
- Non-repudiation often lacking

Limited flexibility

- Changes to file transfers often require updates to many FTP scripts that are typically scattered across machines and require platform-specific skills to alter
- All resources usually have to be available concurrently
- Often only one FTP transfer can run at a time
- Typically transfers cannot be prioritized

Limited visibility and traceability

- Transfers cannot be monitored and managed centrally or remotely
- Logging capabilities may be limited and may only record transfers between directly connected systems
- Cannot track the entire journey of files – not just from one machine to the next but from the start of its journey to its final destination

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What is Managed File Transfer?

Reliable, controlled, auditable movement of files

- No agreed specification for managed file transfer products to certify against
- General consensus that managed file transfer involves the following:

☐ **Auditable**	Who transferred a file? Where? When? Was it this file?
☐ **Reliable**	Automatic resumption of interrupted transfers. No partial file data left lying around
☐ **Secure**	Limits access to authorized users. Protects file data in transit
☐ **Automated**	Designed for “lights out” operation
☐ **Centralized**	Can be monitored and managed from one central location
☐ **Any file size**	Imposes no practical limits on file sizes. Efficient regardless of file size
☐ **Integrated**	Integrates well with applications that typically perform file processing
☐ **Cost effective**	Reuses existing skills and infrastructure

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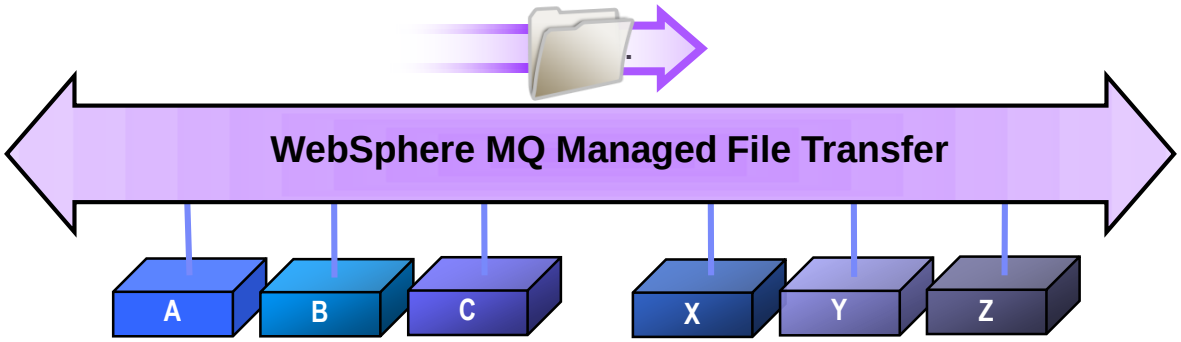
What is WebSphere MQ Managed File Transfer?

Adds managed file transfer capabilities to WebSphere MQ



☑ **Auditable**	Full logging and auditing of file transfers + archive audit data to a database
☑ **Reliable**	Checkpoint restart. Exploits solid reliability of WebSphere MQ
☑ **Secure**	Protects file data in transit using SSL. Provides end-to-end encryption using AMS
☑ **Automated**	Providing scheduling and file watching capabilities for event-driven transfers
☑ **Centralized**	Provides centralized monitoring and deployment of file transfer activities
☑ **Any file size**	Efficiently handles anything from bytes to terabytes
☑ **Integrated**	Integrates with MB, WSRR, ITCAMs for Apps, DataPower® + Connect:Direct
☑ **Cost Effective**	Reuses investment in WebSphere MQ. Wide range of support (inc. z/OS® and IBM System i®)

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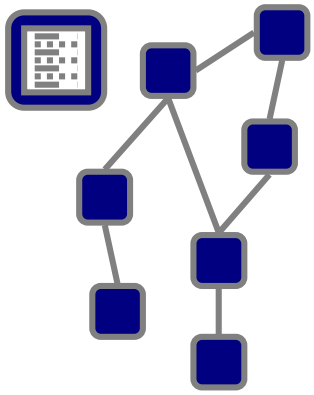
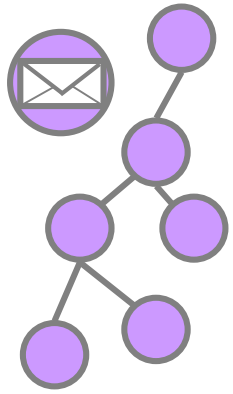
A consolidated transport for both files and messages

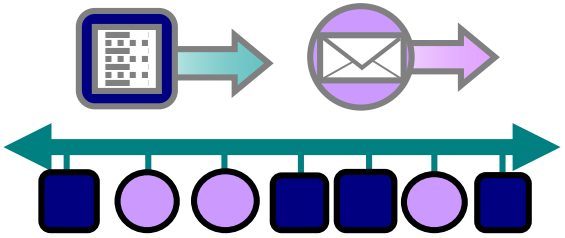
- Traditional approaches to file transfer result in parallel infrastructures
  - One for files – typically built on FTP
  - One for application messaging – based on WebSphere MQ, or similar
- High degree of duplication in creating and maintaining the two infrastructures
- Managed File Transfer reuses the MQ network for managed file transfer and yields:
  - Operational savings and simplification
  - Reduced administration effort
  - Reduced skills requirements and maintenance



File transfers



Application messaging



Consolidated transport for messages and files

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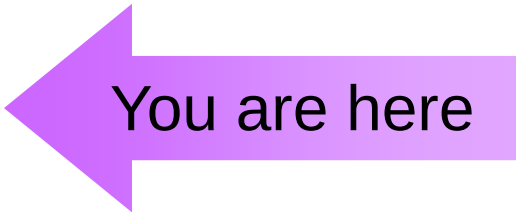
- Introduction to MQ Managed File Transfer
- IBM Managed File Transfer Portfolio
- Key MQ Managed File Transfer concepts
- Usage scenarios for MQ Managed File Transfer



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With Sterling Commerce, IBM offers comprehensive MFT Capabilities

Addressing multiple use cases and scenarios for both internal and multi-enterprise file transfer

WebSphere MQ Managed File Transfer provides file transfer optimized for data delivery across WebSphere MQ networks

Sterling Connect Direct provides peer-to-peer file transfer optimized for data delivery within and between enterprises across Connect:Direct protocol

Sterling File Gateway provides trading partner on-boarding, broad protocol support, management and visibility

Sterling File Gateway includes a plug-in for IBM WebSphere MQ Managed File Transfer

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IBM MFT vision

Accelerate and simplify governance of the growing volume of business-critical data movement within and beyond the enterprise with Smarter MFT

Maximize the agility and performance of dynamic business networks by reducing the complexity, risk, and cost of file transfer

Visibility
- Single view of transfer activity
- Transaction and business monitoring
- Dashboards, analytics, and scorecards

Security and performance
- Assured delivery and high availability
- Protection of file data in transit and at rest
- Accelerated transport and low latency

Usability and management
- Persona-based, easy-to-use interfaces
- Unified control/configuration of infrastructure
- Community on-boarding and coordination

Universal
- Any transport, any protocol, and any partner
- Global and cloud-enabled deployment
- Broad platform coverage and industry standards

Connectivity
- Integration with BPM to drive business processes
- Using ESBs to enable service orientation
- SOA registry/repository for lifecycle governance

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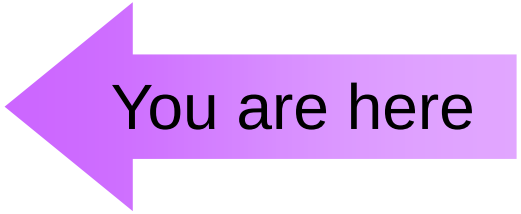

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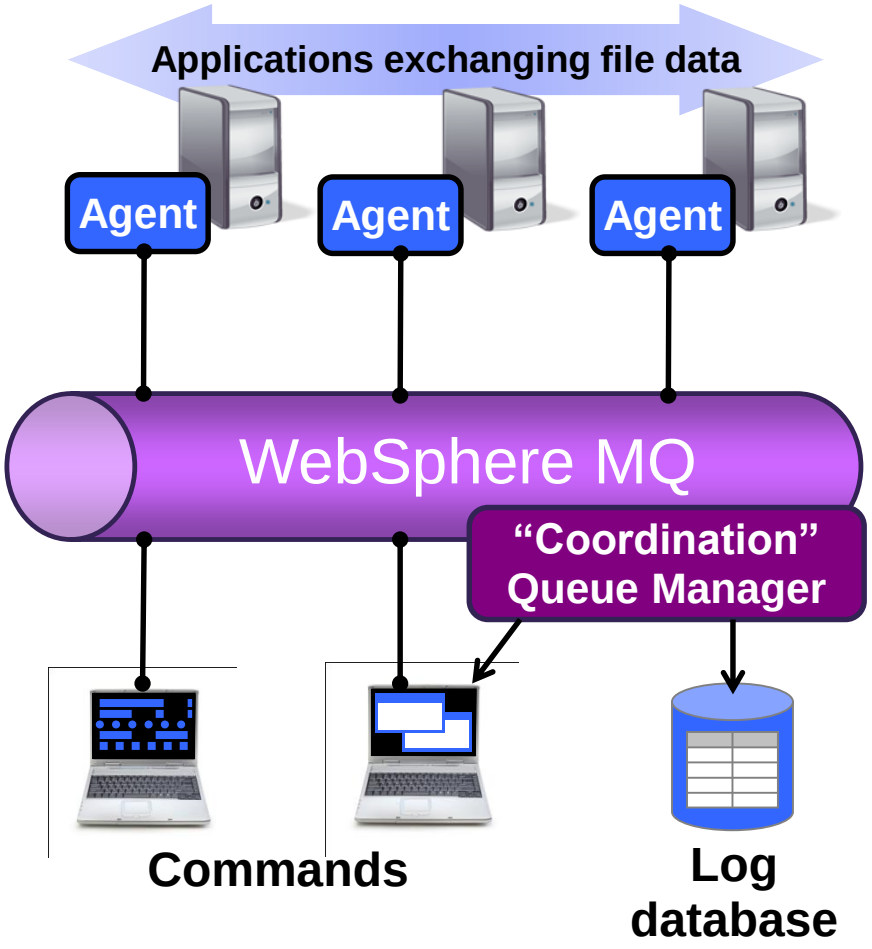
Components of a typical WMQ MFT network

- **Agents**
  - The endpoints for managed file transfer operations
- **Commands**
  - Send instructions to agents
- **Log database**
  - A historical record of file transfers
- **Coordination queue manager**
  - Gathers together file transfer events



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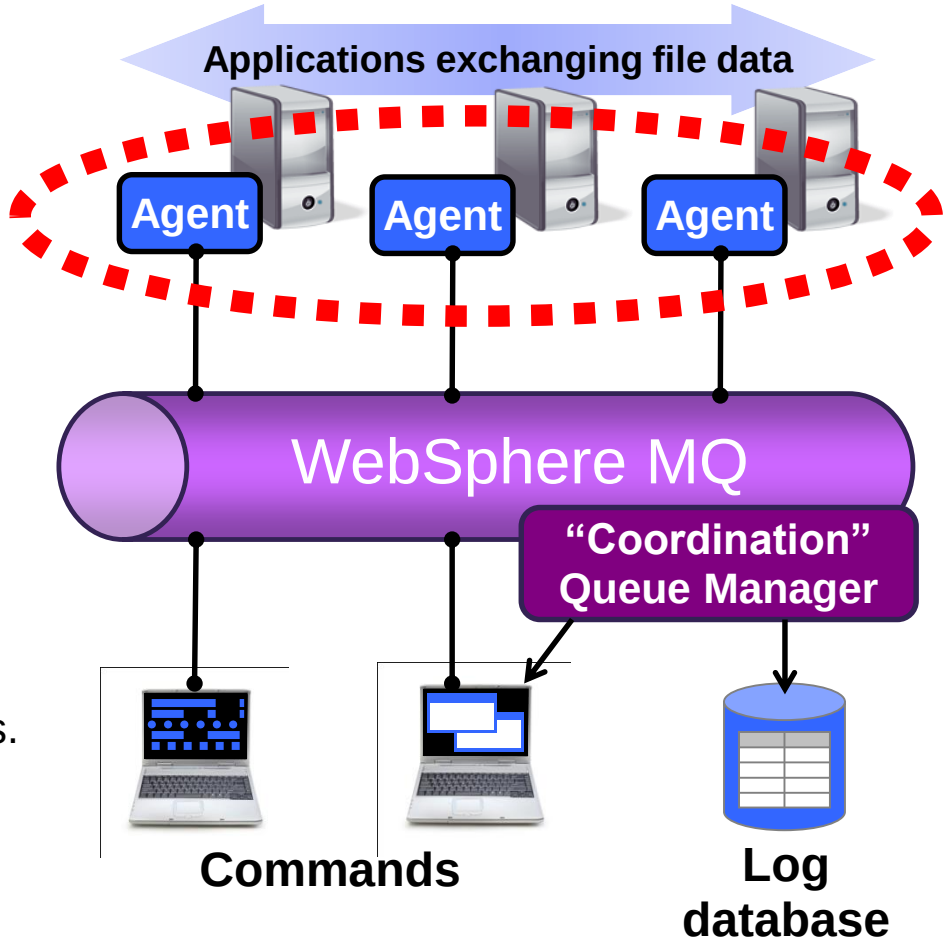
Components of a typical WMQ MFT network agents

- Act as the end points for file transfers
- Long running MQ applications that transfer files by splitting them into MQ messages
  - Efficient transfer protocol avoids excessive use of MQ log space or messages building up on queues.
- Multi-threaded file transfers
  - Can both send and receive multiple files at the same time
- Generate a log of file transfer activities which is sent to the “coordination queue manager”
  - This can be used for audit purposes.
- Associated with one particular queue manager (either v6 or v7)
  - Agent state on queues



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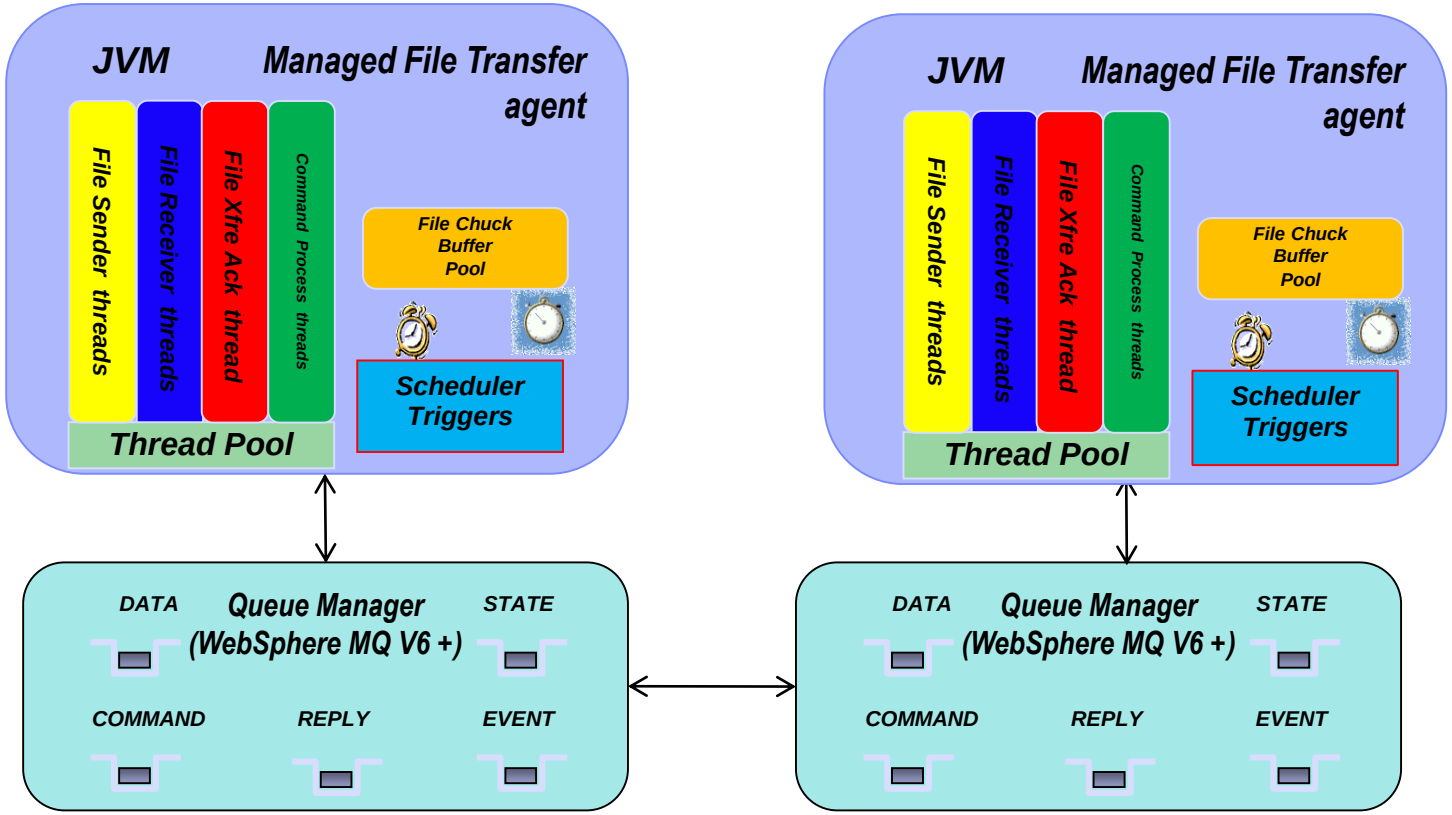
WebSphere MQ Managed File Transfer agent architecture



- Multi-threaded architecture for performance and scalability
- Highly efficient WebSphere MQ pacing-based stream I/O with full in-flight checkpoint and restart
- Built-in scheduler and trigger support
- Bindings (server) and client support
- Uses WebSphere MQ Publish and Subscribe infrastructure for transfer logs and progress

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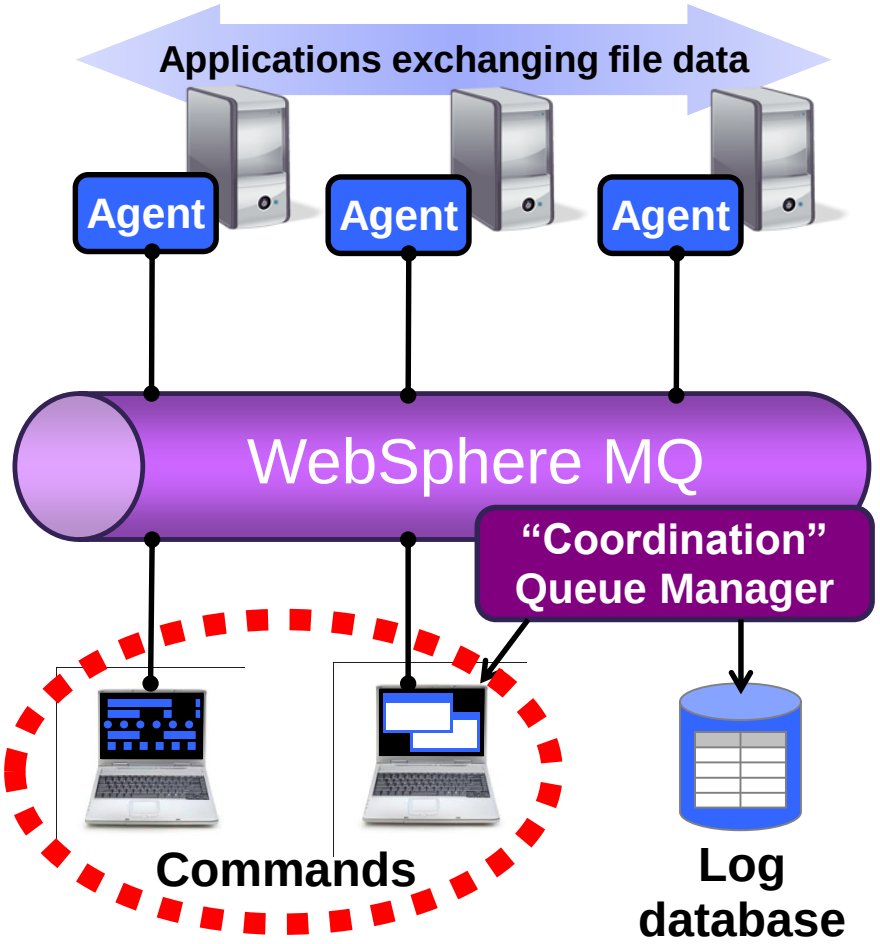
Components of a typical WMQ MFT network – Commands

- Send instructions to agents and display information about agent configuration
  - Via MQ messages
- Many implementations of commands:
  - MQ Explorer plug-in
  - Command line programs
  - Open scripting language
  - JCL
  - Documented interface to program



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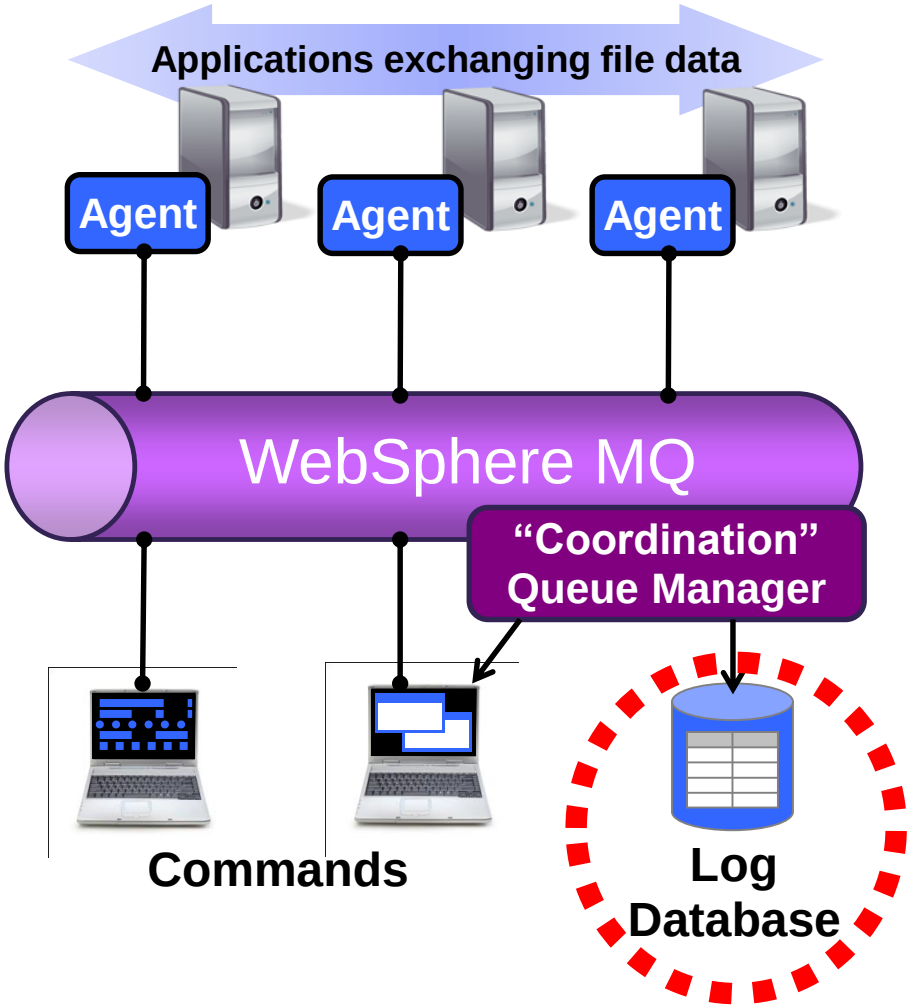
Components of a typical WMQ MFT network – Log database

- Keeps a historical account of transfers that have taken place
  - Who, where, when… etc.
- Implemented by the 'database logger' component which connects to the coordination queue manager
  - Stand-alone application
  - Or JEE application
- Queryable via web gateway
  - Also a documented interface



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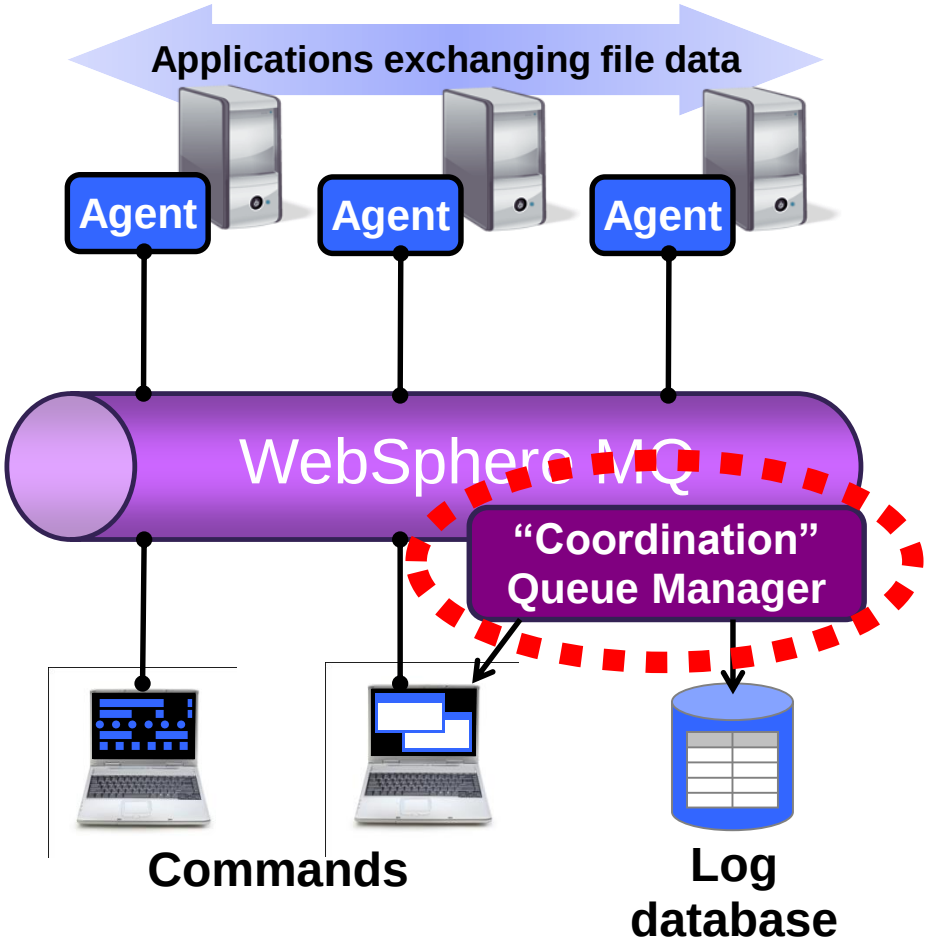
Components of a typical WMQ MFT network – Coordination Queue Manager

- Gathers together information about events in the file transfer network
- Not a single point of failure
  - Can be made highly available
  - Messages stored + forwarded
- MQ v7 publish/subscribe
  - Allows multiple log databases, command installs
  - Documented interface



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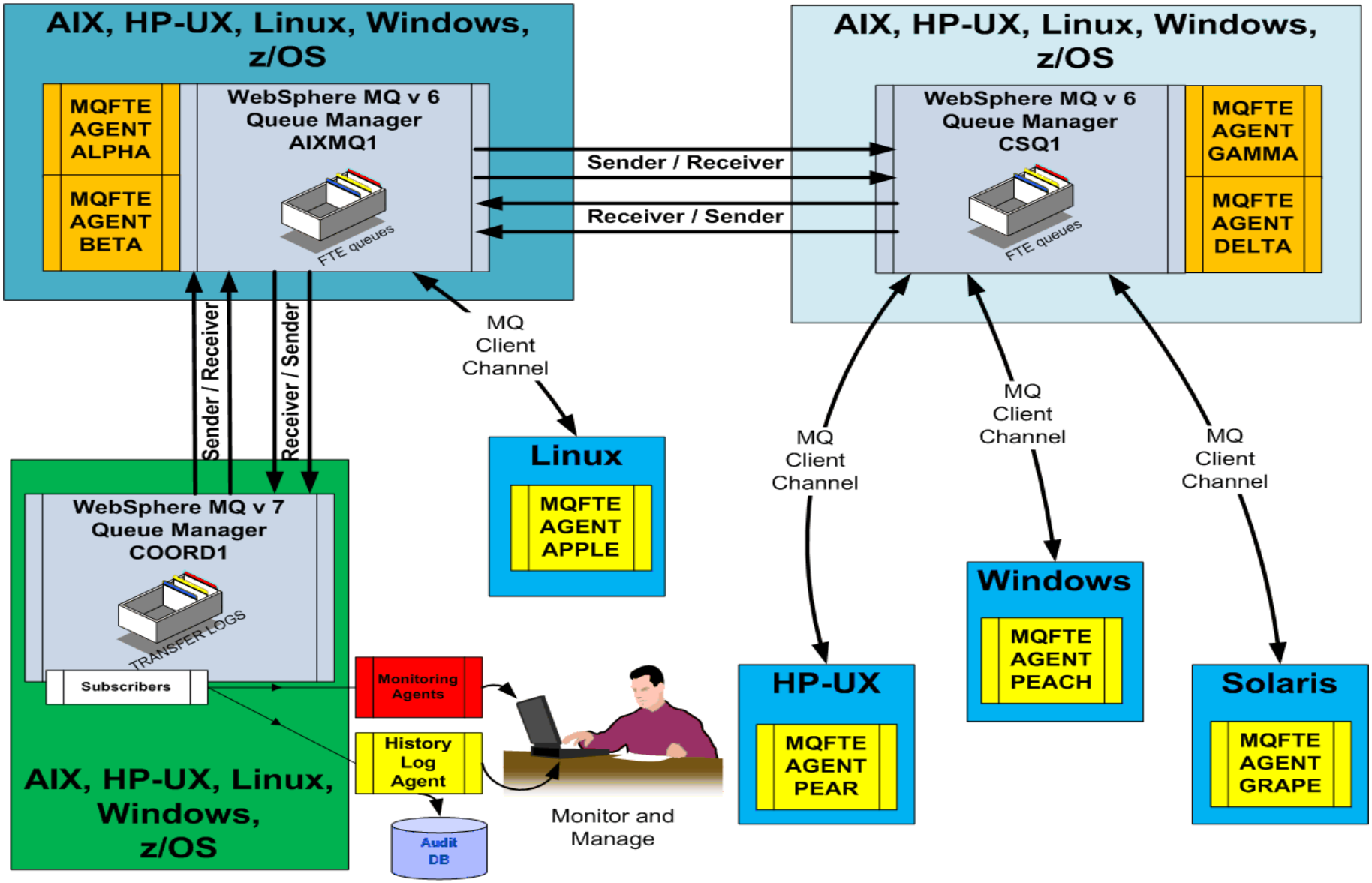
Deployment



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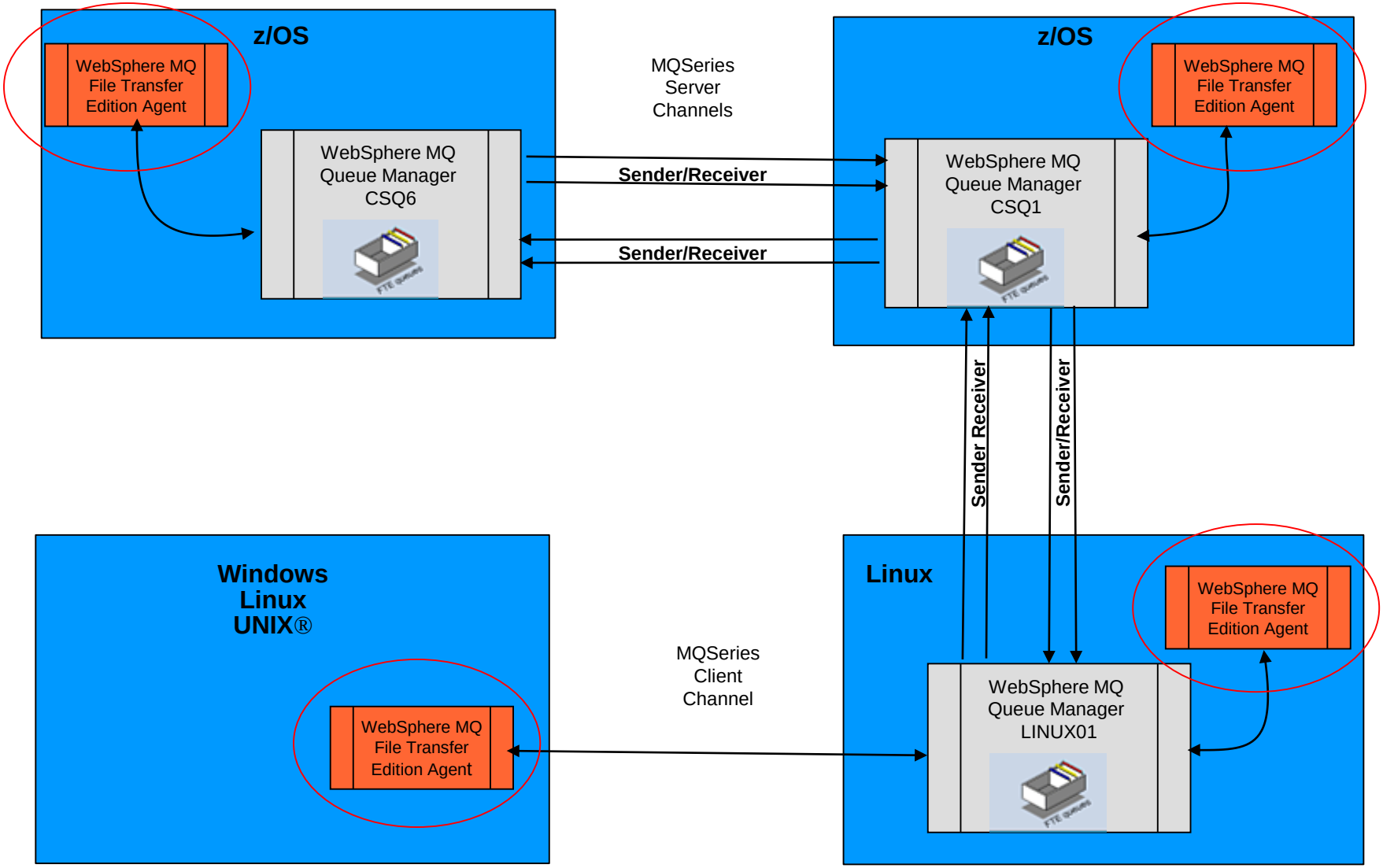
WebSphere MQ Managed File Transfer Agent using Server Connection



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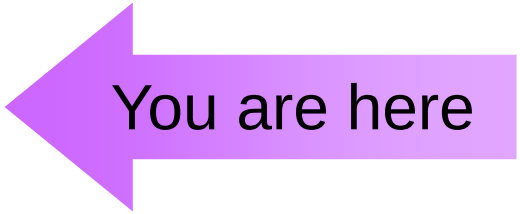

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Scenario: Painful FTP-based solution

- Pain point
  - Home-grown, FTP-based solution is unreliable and hard to manage.

- Managed File Transfer helps
  - Directory monitoring/scripting/JCL provides integration with existing systems without the need for modifications
  - Protocol bridge allows a staged migration from existing FTP/SFTP infrastructure
  - Integrates with existing infrastructure:
    - IBM Message Broker
    - IBM Sterling Connect:Direct
  - Combines with B2B products:
    - DataPower XB60/XI50
    - IBM Sterling File Gateway
  - Secured by industry standard SSL or WebSphere MQ AMS

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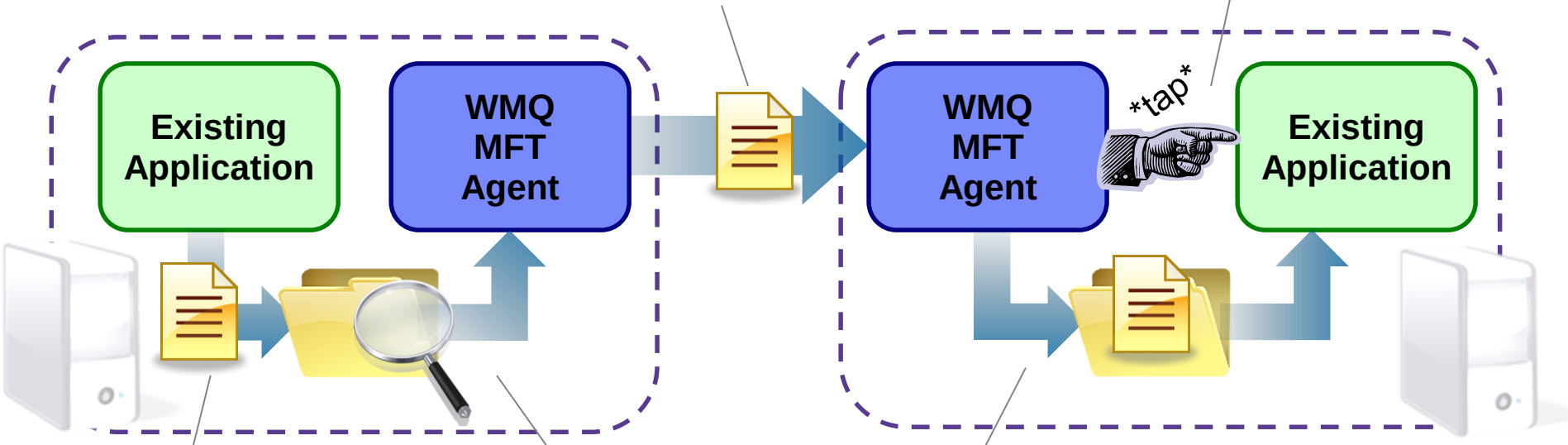
Example usage of monitoring and program execution

5. MFT can also start another application to process the file.

3. MFT transports file to destination.



1. Application writes file to file system.

2. Agent monitors file system, spots arrival of file and based on rules, transfers the file.

4. At destination, MQ MFT writes file to file system.

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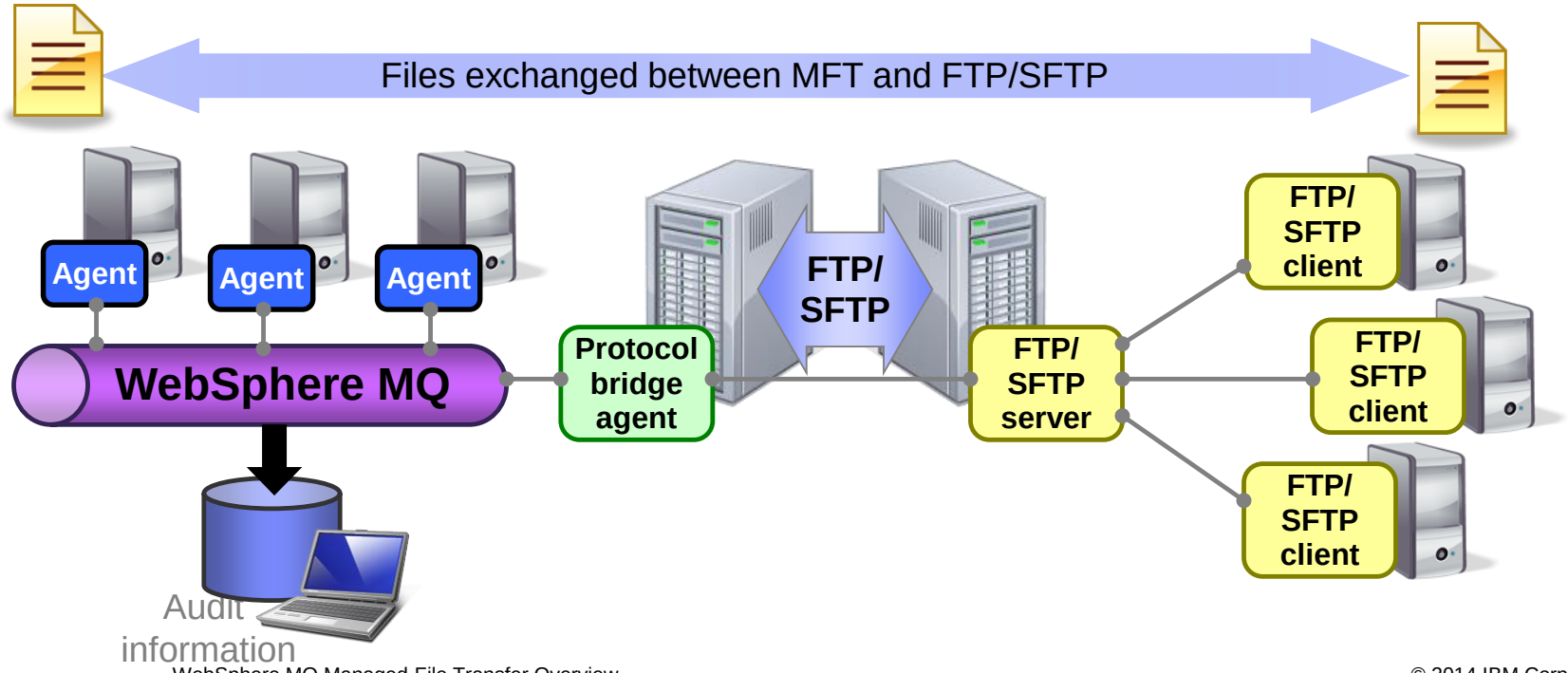
Protocol bridging agents

- Support for transferring files located on FTP and SFTP servers
  - The source or destination for a transfer can be an FTP or an SFTP server
- Enables incremental modernization of FTP-based, home-grown solutions
  - Provides auditability of transfers across FTP/SFTP to central audit log
  - Ensures reliability of transfers across FTP/SFTP with checkpoint restart
- Fully integrated into graphical, command line and XML scripting interfaces
  - Just looks like another MFT agent…



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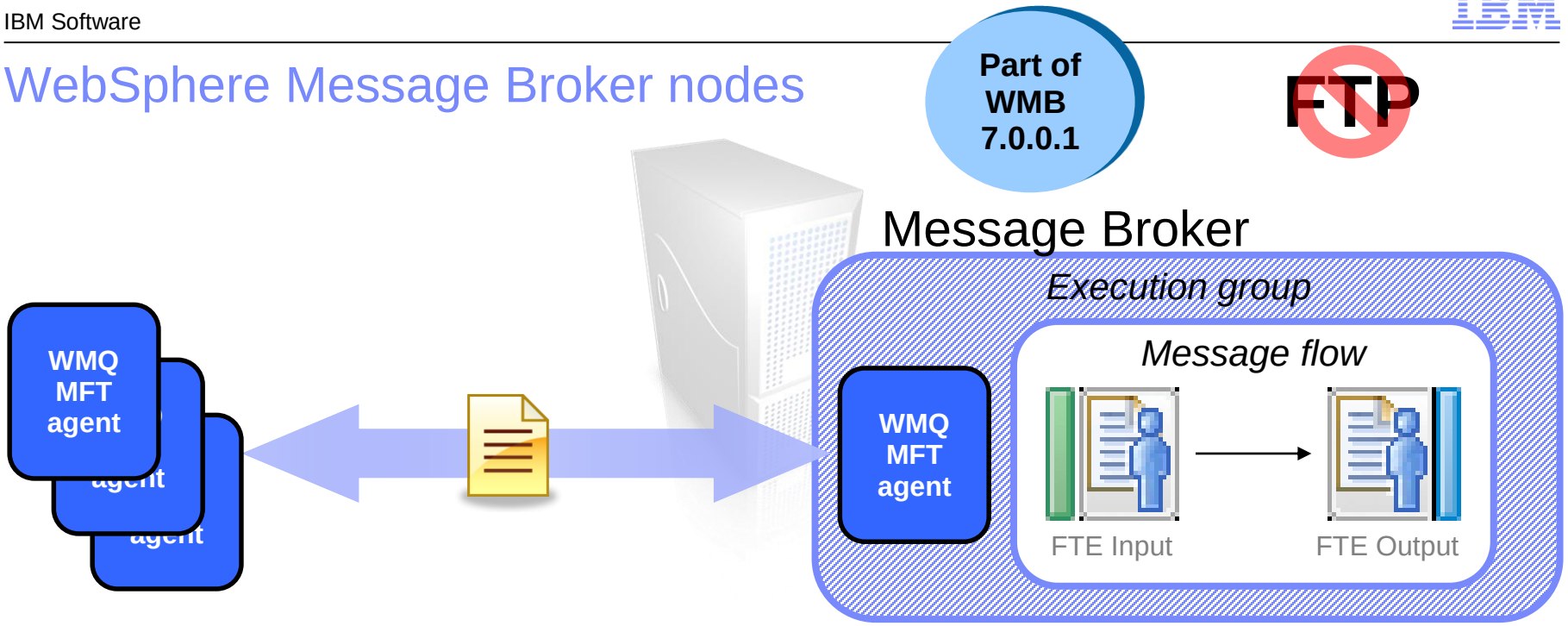
WebSphere Message Broker nodes



- FTE Input node
  - Build flows that accepts file transfers from the WMQ MFT network
- FTE Output node
  - Build flows that are designed to send a file across a WMQ MFT network
- When WMQ MFT nodes are used in a flow an MFT agent is automatically started in the Message Broker execution group

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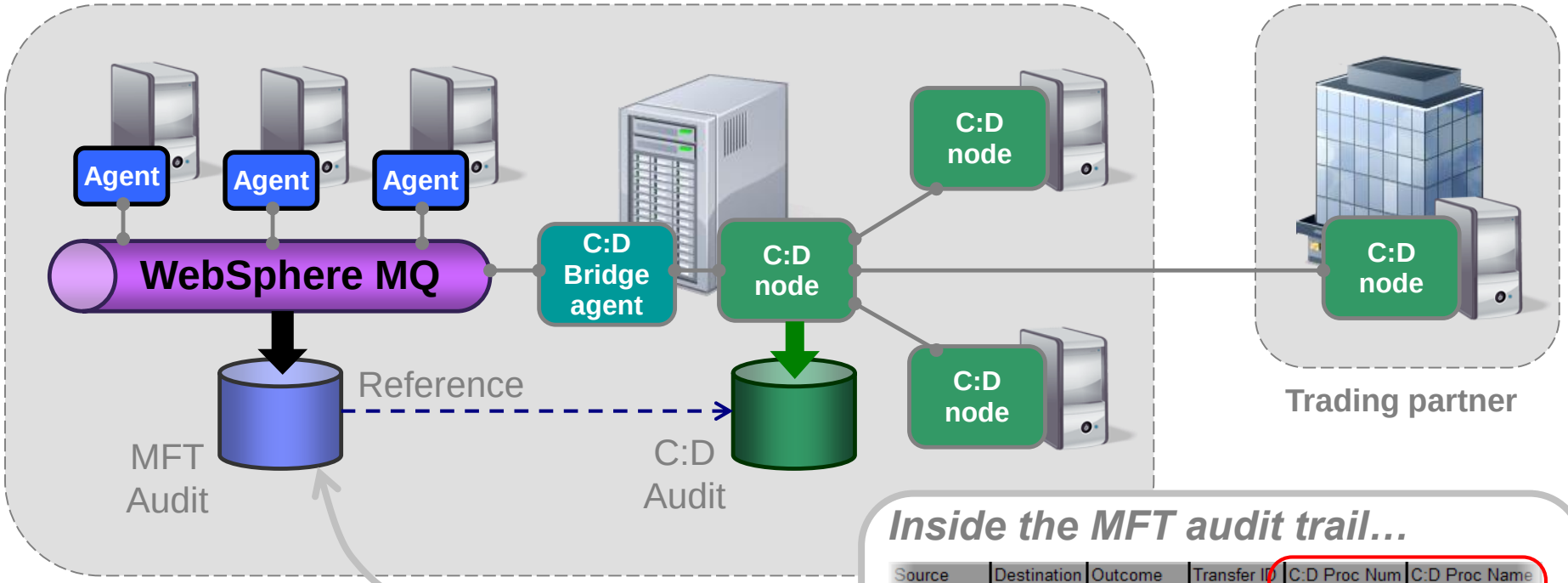
Integration with IBM Sterling Connect:Direct



- The Connect:Direct bridge capability supports managed file transfers that span MFT and C:D with a joined up audit trail.

Inside the MFT audit trail…

Source	Destination	Outcome	Transfer ID	C:D Proc Num	C:D Proc Name
FTEAgent1	CDNode6	Success	0A9B43F...	34	FTE0934
FTEAgent1	CDNode6	Success	1CF3B73...	39	FTE92B6
CDNode2	FTEAgent4	Success	D1839F2...	42	FTE13C9
CDNode4	FTEAgent2	In Progress			

The audit information for each MFT transfer references related C:D audit information.

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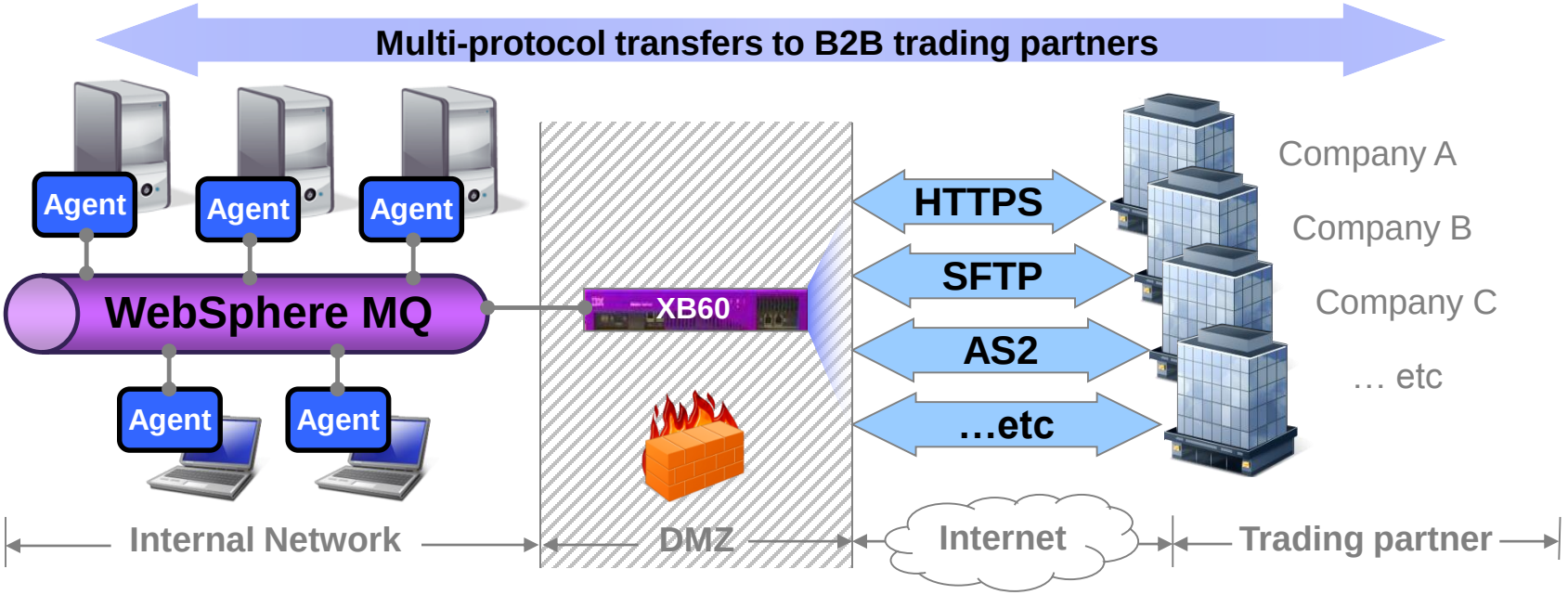
Interoperation with DataPower XB62 B2B appliance

- Documented and tested configurations for integrating with DataPower appliances
  - WebSphere DataPower XB60 B2B appliance – for B2B connectivity
  - WebSphere DataPower XI50 integration appliance – for ESB connectivity
- Enables sending files to trading partners over a range of protocol transports
  - via DataPower appliances acting as B2B gateways



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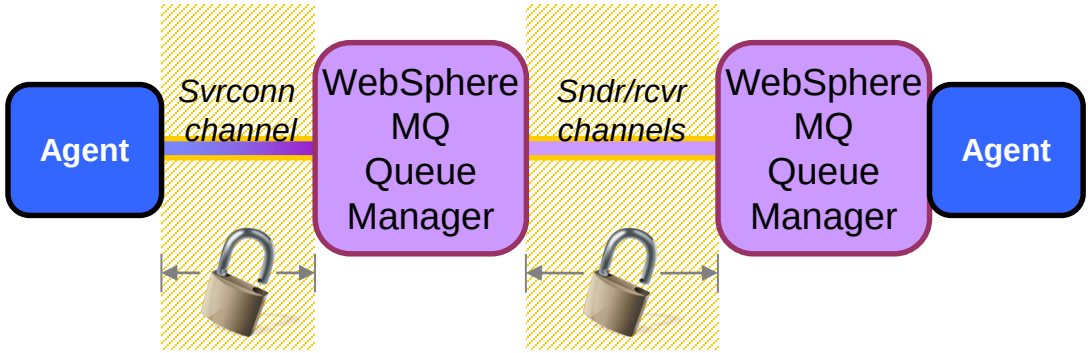
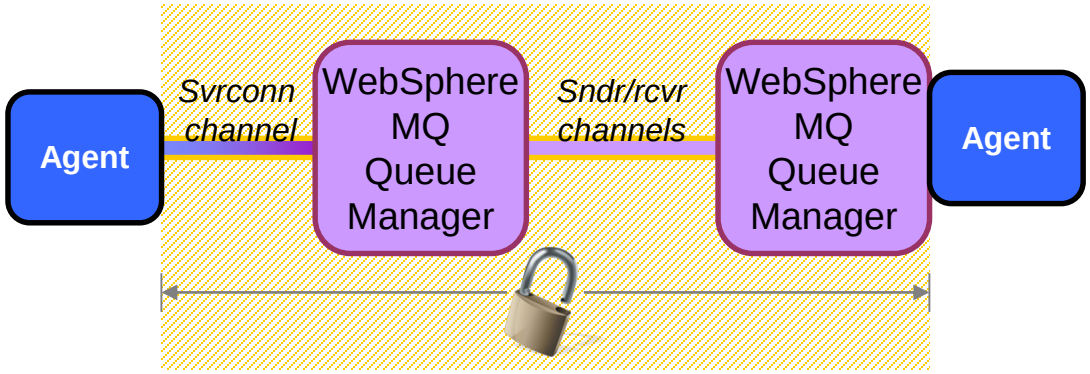
Securing file data with SSL and WMQ AMS



- WMQ MFT supports transport-level encryption using SSL.
- Data is encrypted before it is sent over a channel and decrypted when it is received.



- When combined with WMQ Advanced Message Security
  - Allows file data to be encrypted at the source system and only decrypted when it reaches the destination system
  - Data is secure – even when at rest on a queue

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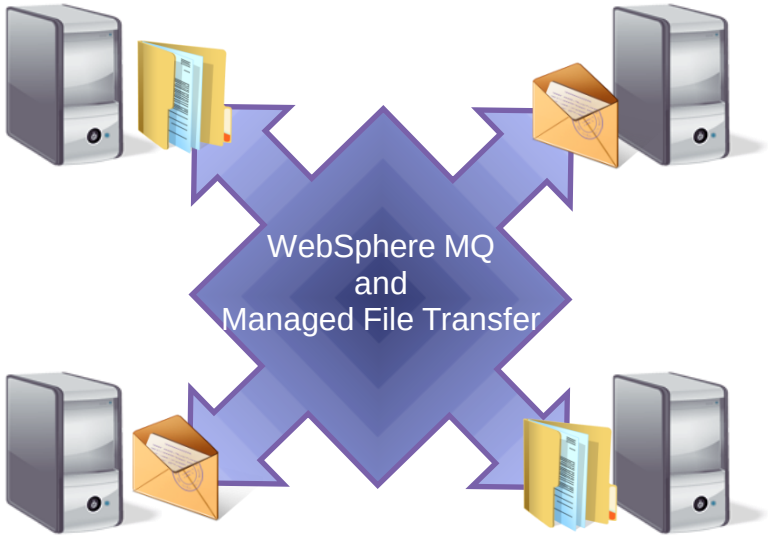
Scenario: Staged migration to messaging

- Pain point
  - Hard to migrate to an event-driven architecture, as lots of applications communicate by transferring files
- Managed File Transfer helps
  - Deliver files as message payloads and vice versa
  - Monitor queues and transfer message payloads to files



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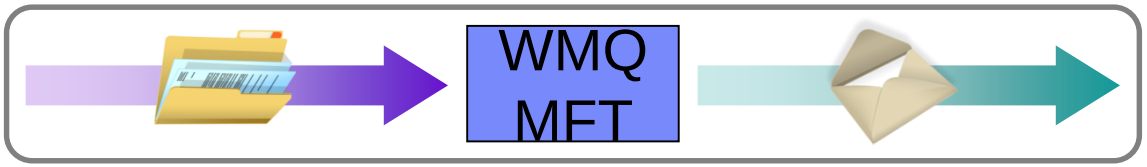
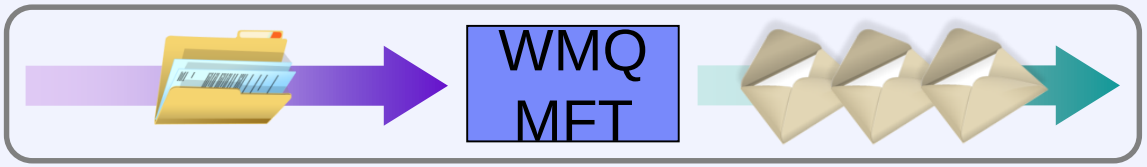
Options for converting data between files and messages

One file to one message



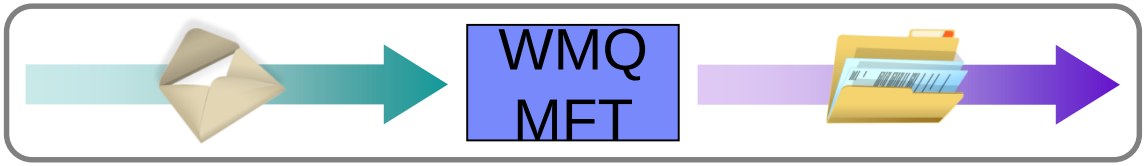
- One file becomes one message

One file to a group of messages



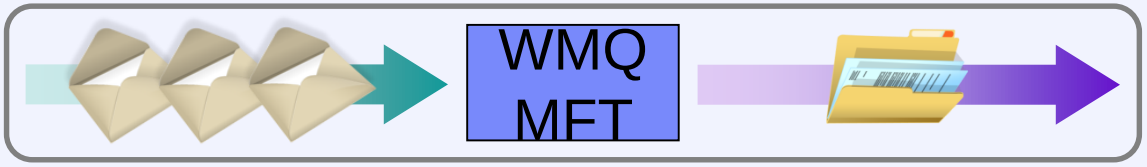
- The file can be split based on
  - Size
  - Binary delimiter
  - Regular expression

One message to one file



- One message becomes one file

A group of messages (or all messages on the queue) to one file



- Optionally, a delimiter can be inserted between each message used to compose the file.

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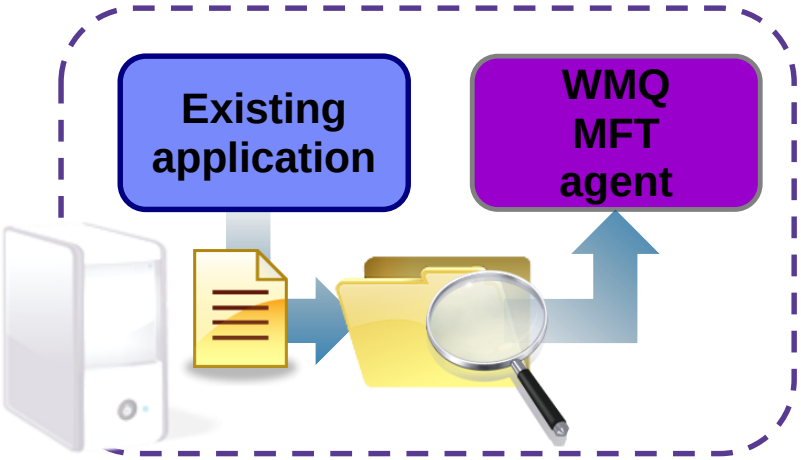
Monitoring queues for the arrival of messages

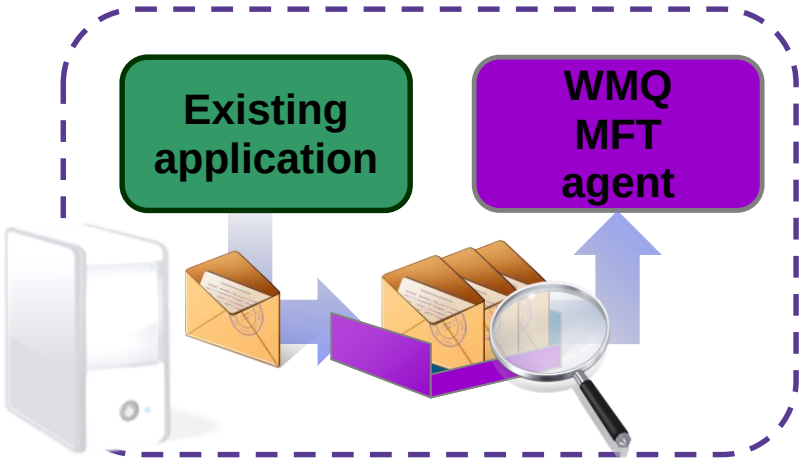
Remember, MFT can monitor for files arriving.



- The WMQ MFT agent can monitor queues for the arrival of messages, then perform an action, such as transferring the payload from the messages as a file. (as per the previous slide)

- Conditions that can be monitored
  - Queue not empty
  - Complete group of messages

Well, it can also monitor for messages arriving on a queue.



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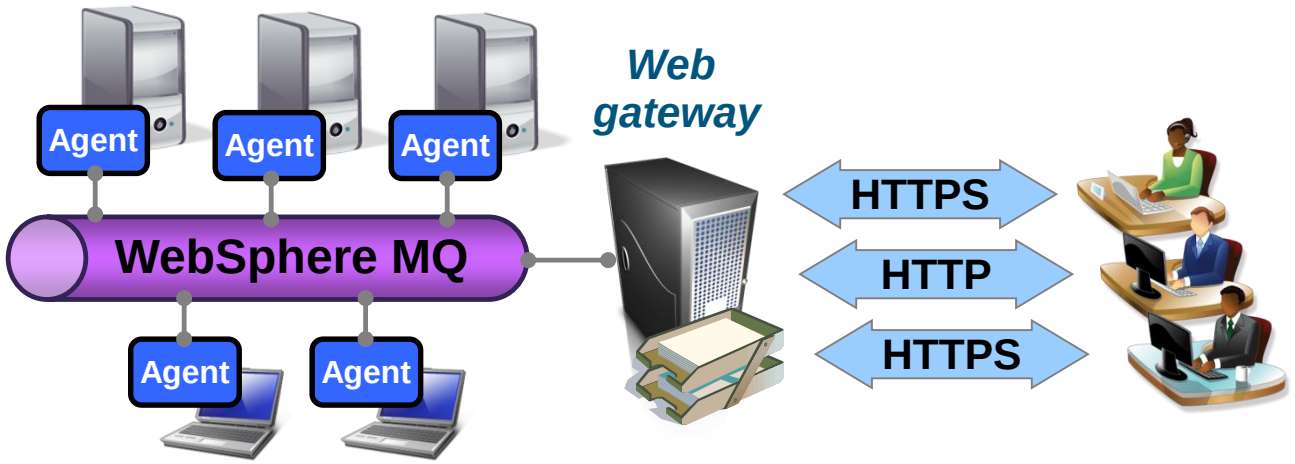
Scenario: Web-based managed file transfers

- Pain points
  - Difficult to mix human-imitated file transfers with existing infrastructure for machine-to-machine managed file transfer
  - Managed file transfers to zero-install, small-footprint devices
- Managed File Transfer helps
  - A RESTful API for exchange files with an WMQ MFT network
  - Example web 2.0 applications to use as a starting point



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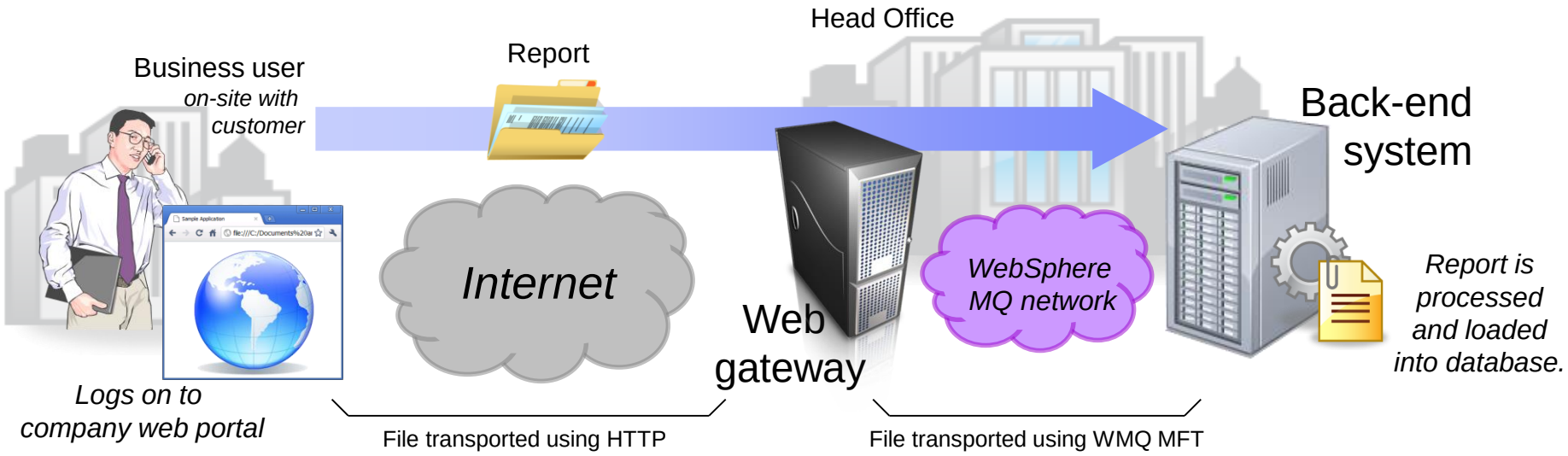
Enabling business users to upload files from a remote location

Web gateway example, business scenario:

- In this example, usage scenario the web gateway allows a business user to upload a file (via the company web portal) to a back-end system, where it can be processed.



1. The business user logs onto the company web portal using a web browser and is prompted to select a file to upload.
2. The portal uses the RESTful API provided by the web gateway to upload the file using HTTP.
3. The web gateway transfers the file, using WMQ MFT, to a back-end system.
4. At the back-end system, WMQ MFT starts a program to process the data from the file.

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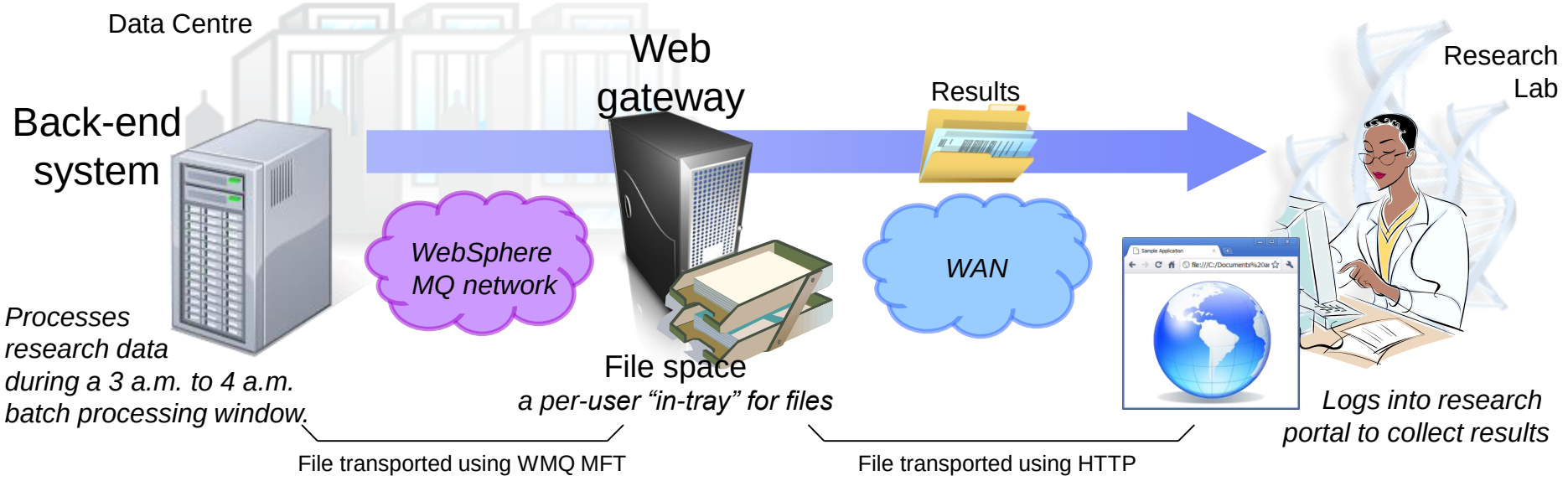
Enabling researchers to pick up the results of a batch process

Web gateway example, business scenario:

- In this example, the web gateway enables a researcher to pick up files that have been produced (hours earlier) by batch processing, at a back-end system.



1. A batch process running at the data center produces a set of results which it sends, using WMQ MFT, to the web gateway.
2. The web gateway system places the data into a *file space,* where it awaits collection by the user.
3. The user logs in to the research portal using her web browser and is shown a list of files waiting for her attention.
4. The user selects a file to download and the web gateway transfers the file to her computer.

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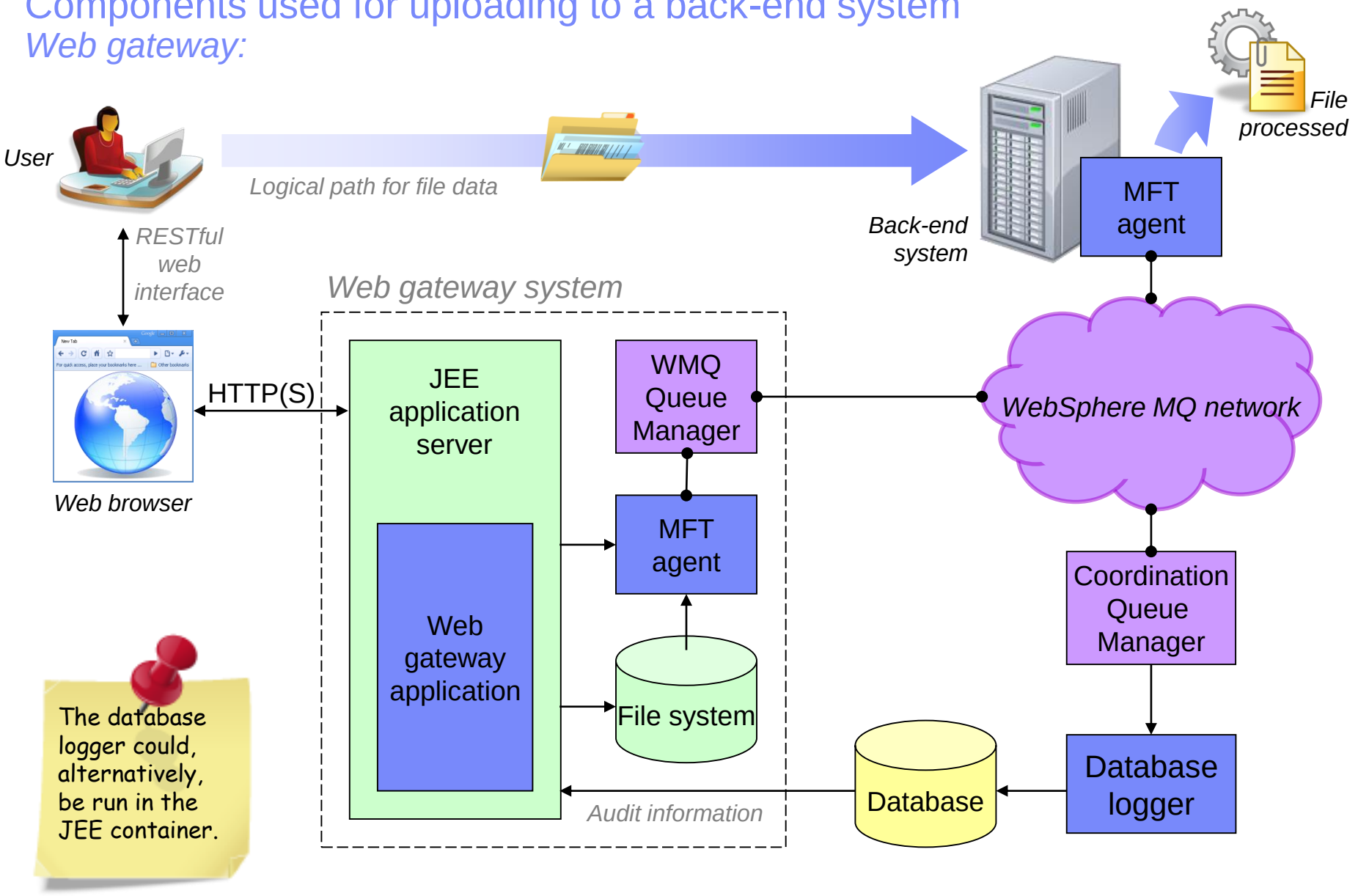
Components used for uploading to a back-end system

Web gateway:



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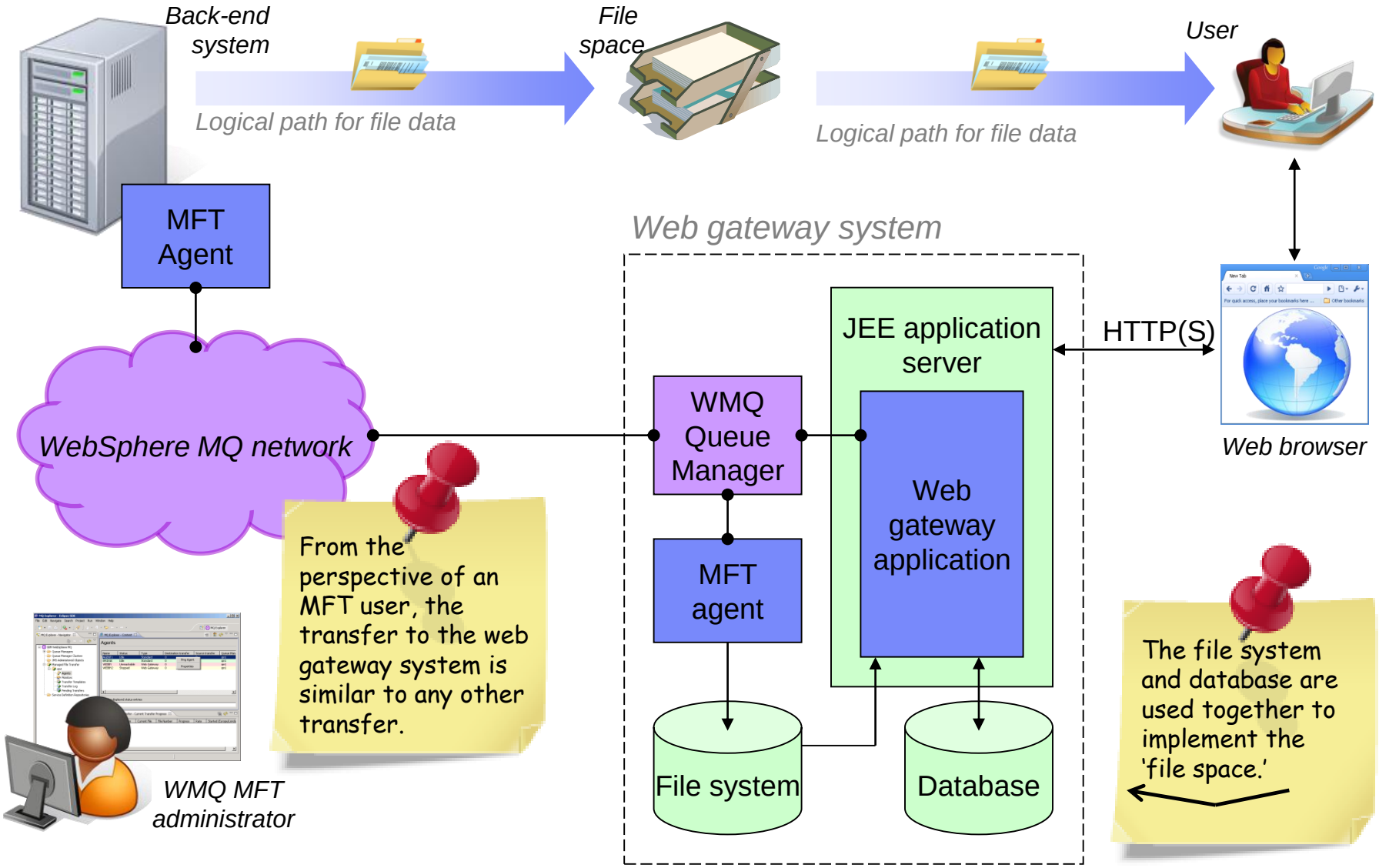
Components used for sending a file to an web-user

Web gateway:



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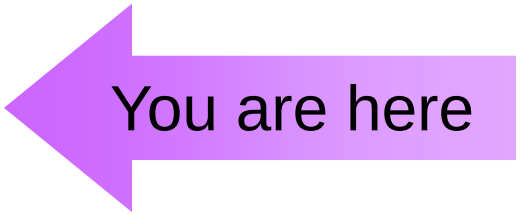
Agenda

- Common problems transferring file data
- Introduction to MQ Managed File Transfer
- IBM Managed File Transfer Portfolio
  - Introducing IBM Sterling Commerce products
- Key MQ Managed File Transfer concepts
- Usage scenarios for MQ Managed File Transfer
- Wrap-up
  - Resources
  - Please provide feedback
  - Questions



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Resources

- WMQ V7.5 Information Center:
  - http://pic.dhe.ibm.com/infocenter/wmqv7/v7r5/index.jsp
- WMQ V7.5 Managed File Transfer Introduction:
  - http://pic.dhe.ibm.com/infocenter/wmqv7/v7r5/topic/com.ibm.wmqfte.doc/wmqfte_intro.htm
- Redbooks/Redguides/Redpapers:
  - Getting Started with WebSphere MQ Managed File Transfer V7
    - http://www.redbooks.ibm.com/abstracts/sg247760.html
  - IBM WebSphere MQ Managed File Transfer Solution Overview
    - http://www.redbooks.ibm.com/abstracts/redp4532.html
  - Managed File Transfer for SOA using IBM WebSphere MQ Managed File Transfer
    - http://www.redbooks.ibm.com/abstracts/redp4533.html
  - B2B Enabled Managed File Transfer using WebSphere DataPower B2B Appliance XB60 and WebSphere MQ Managed File Transfer
    - http://www.redbooks.ibm.com/abstracts/redp4603.html
  - IBM Sterling Managed File Transfer Integration and WebSphere Connectivity for a Multi-Enterprise Solution
    - http://www.redbooks.ibm.com/abstracts/sg247927.html?Open
  - Multi-Enterprise File Transfer with WebSphere Connectivity
    - http://www.redbooks.ibm.com/abstracts/sg247886.html?Open
- Trial download:
  - http://www.ibm.com/software/integration/wmq/filetransfer/
- Early design program
  - Interested in participating in the development of future versions of MFT?
    - Ask your local IBM representative to nominate you for the MFT EDP program.

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