

IBM Software Group

## Case Study: Integrating WDI with WBI at Quantum Corporation

*Mark Lutze and Hal Render*

**WebSphere.** software

# Quantum<sup>®</sup>

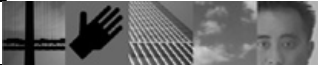


**@business software**

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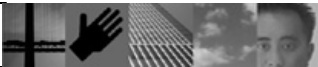
# Who We Are and What We Do

- Quantum Corporation
  - Global leader in data protection products and services, and the world's largest supplier of computer tape drives
  - Customers include HP, Dell, Hitachi Data Systems, IBM, and Sun Microsystems
  - More than 30 domestic and 35 international distributors
- Presenters
  - Mark Lutze – [mark.lutze@quantum.com](mailto:mark.lutze@quantum.com)
  - Dr. Hal Render – [hal.render@quantum.com](mailto:hal.render@quantum.com)
- We are in the eBusiness group at Quantum and have two duties:
  - *Enterprise Application Integration (EAI)*
  - *Business-to-Business (B2B) integration, primarily using EDI*

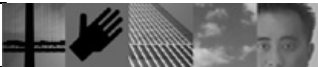
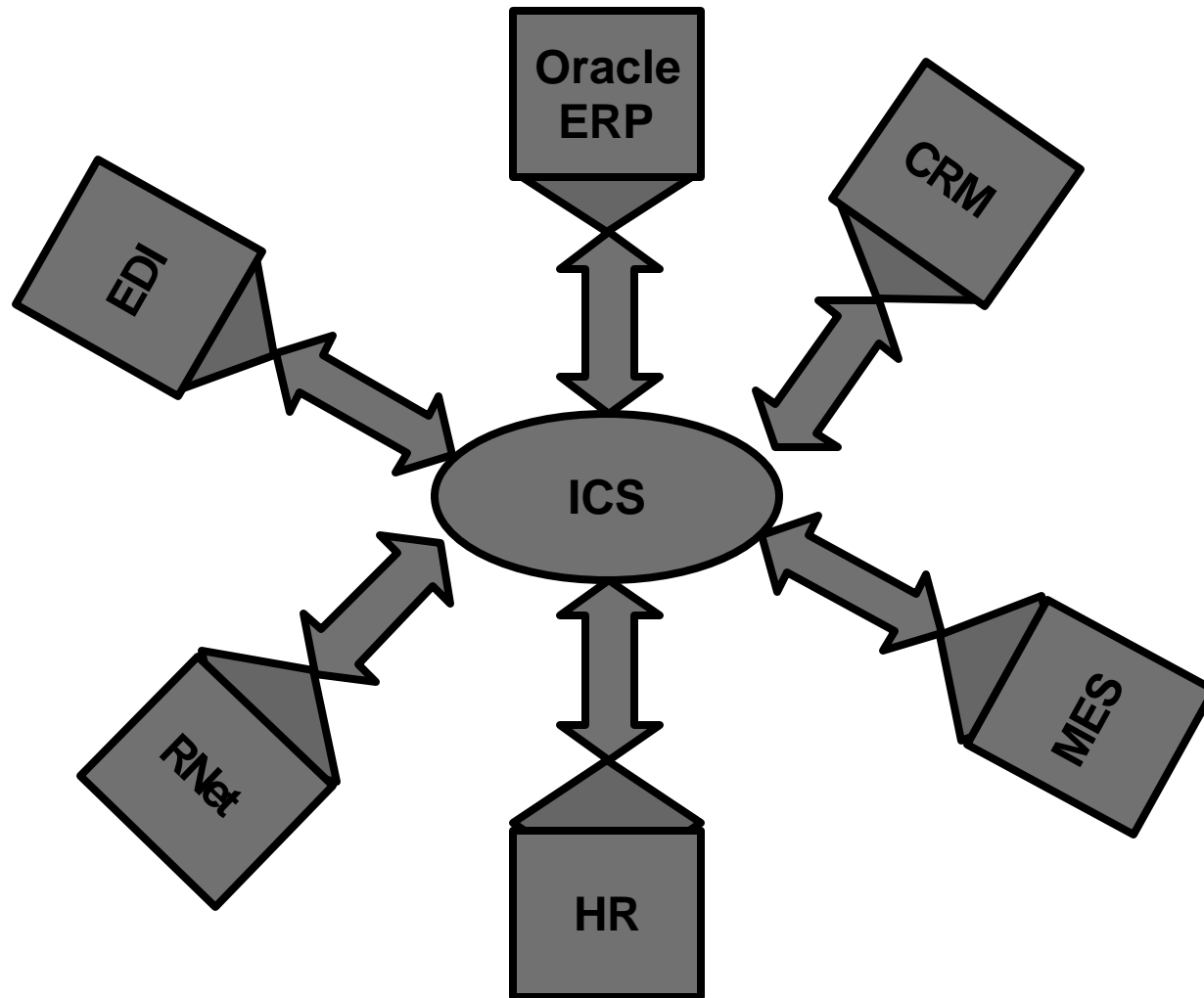


# How We Came To Use WDI/WBI – Part 1

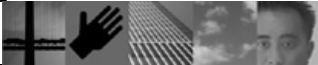
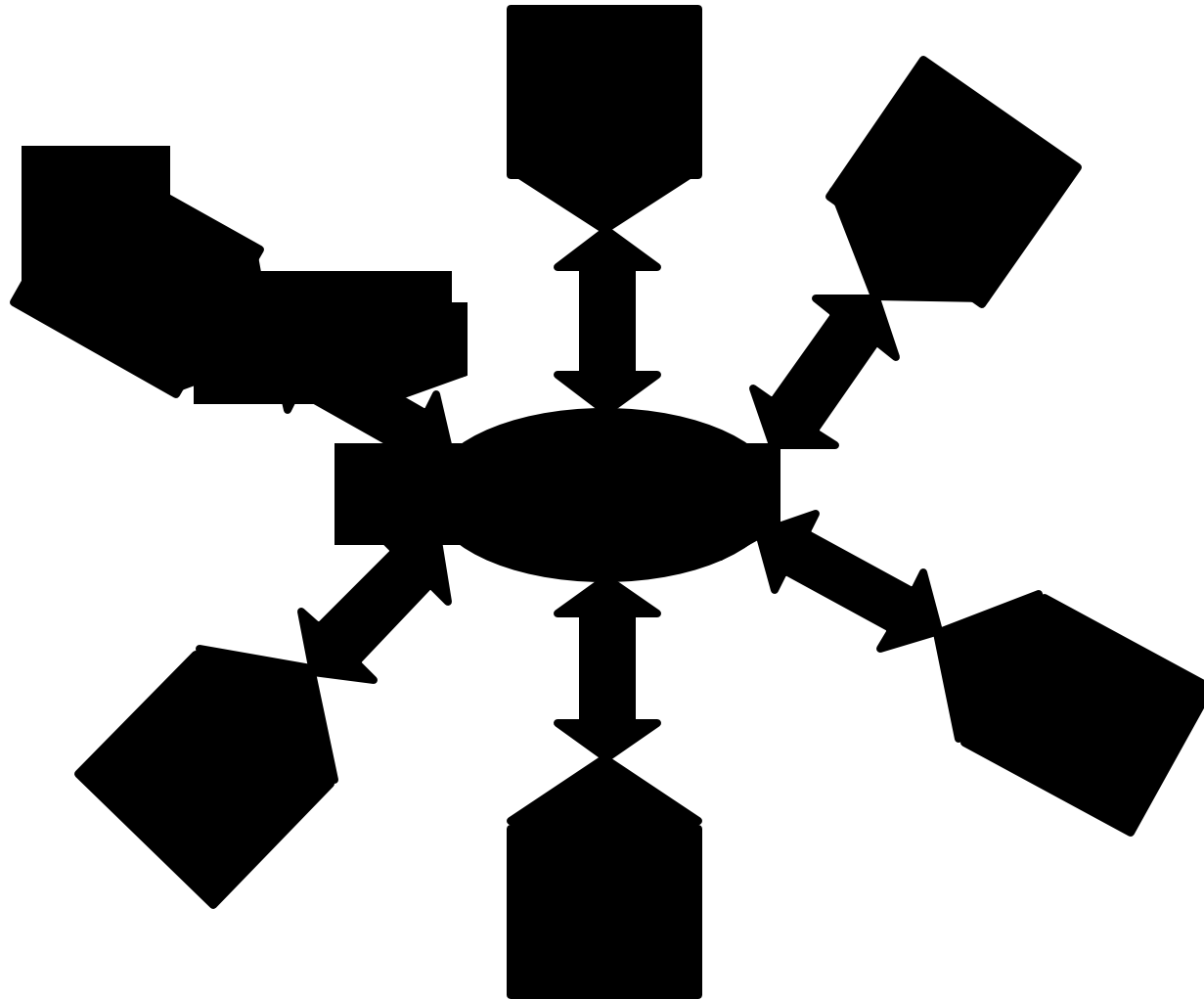
- 2000: Chose CrossWorlds Software for EAI and B2B Integration
  - Used for RosettaNet pilots involving WebMethods, Viacore, and later Cyclone Commerce to connect directly to trading partners
  - Used for initial production EAI implementations
  
- 2001-2: Migration of EDI legacy infrastructure to CrossWorlds
  - Inherited corporate EDI responsibilities, and found that our legacy EDI translator (AMTriX) was end-of-life
  - Felt CrossWorlds with its *Trading Partner Interchange* (TPI) and EDI Data-handler components looked promising for EDI processing
  - Used CrossWorlds to implement EDI 850, 820, 823, 810 and other EAI and B2B implementations, including support for major ERP upgrade
  - Noted various issues, and came to the conclusion that CrossWorlds by itself is not an ideal EDI solution.



# EAI – Hub and Spoke Architecture

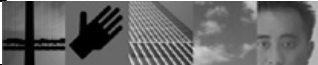


# CrossWorlds with TPI and EDI Data Handler

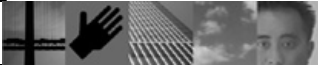
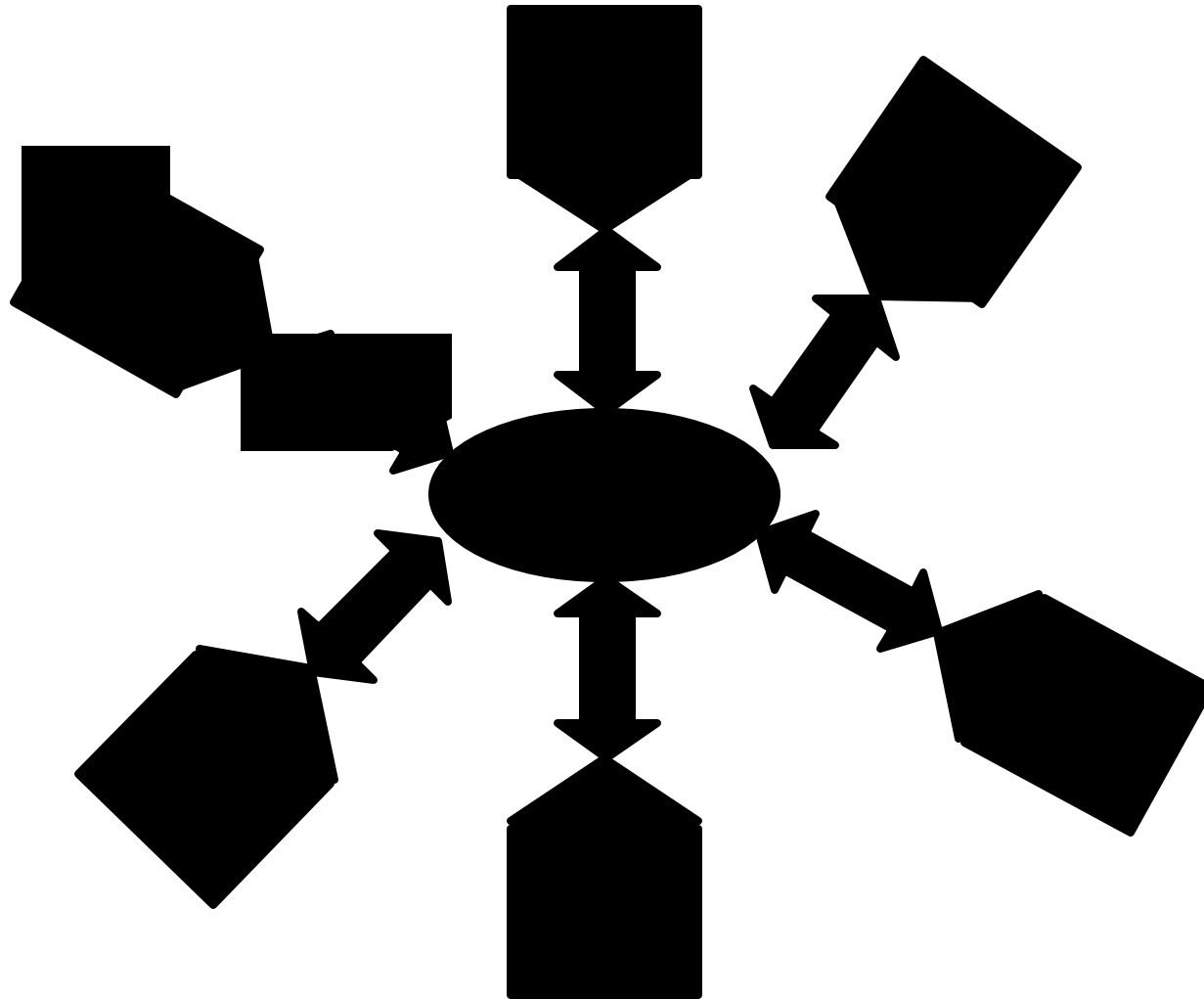


## How We Came To Use WDI/WBI – Part 2

- 2002-3: WDI to the Rescue
  - IBM purchased CrossWorlds and renamed product *WebSphere Business Integration* (WBI). IBM postponed enhancements to TPI and EDI data-handler components. We learned of WDI.
  - Quantum outsourced its manufacturing, which required us to implement many new EDI transactions quickly – enter WDI.
  - Held a 1-week trial to prove that we could get WDI running in our environment and have it communicate with WBI. Mostly this involved installing the software and configuring MQSeries.
  - Held another 1-week trial to expand on prior work and demonstrate functionality of WDI. Did 1 inbound and 1 outbound EDI transaction.
  - Had a 1-Week onsite training/mentoring session with WDI consultant.
  - Developed & deployed 7 new EDI transactions in 6 weeks using WDI.

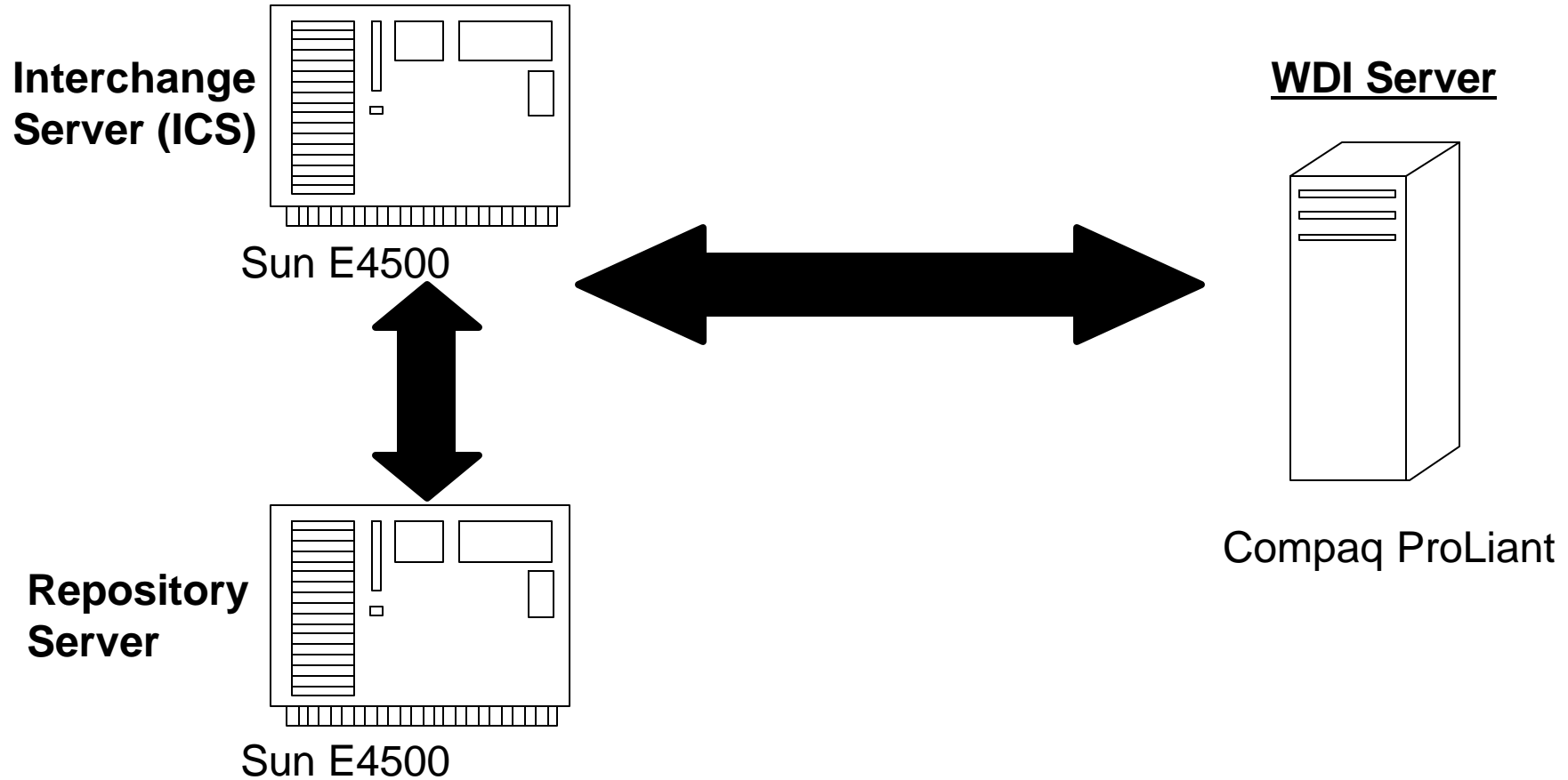


# WDI and WBI



# Environment - Overview

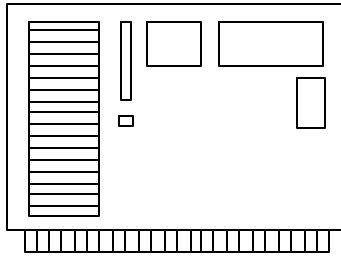
## WBI (CrossWorlds) Server Cluster





# Environment – MQ Configuration

## WBI Server Cluster

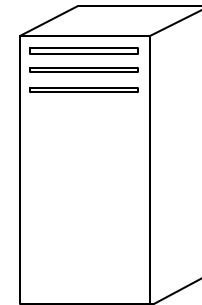


**Queue Manager:**  
cwprod.queue.manager

**Remote Queues:**  
EDI\_IN  
XML\_IN

**Local Queues:**  
EDI\_OUT  
XML\_OUT

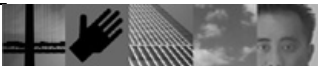
## WDI Server



**Queue Manager:**  
QM\_wdi1

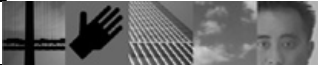
**Local Queues:**  
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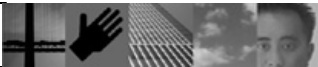
## Environment - Hardware

- Separate Development, Stage and Production environments
- WBI Production and Stage environments:
  - Each environment is a Veritas cluster
  - 2 Sun E4500 nodes in each cluster
  - Each node has 8 processors, 4 gigabytes of physical memory
- WBI Development environment
  - 1 Sun E4500 with 4 processors and 4 gigabytes of memory
- WDI Production environment
  - 1 Compaq DL360s with 1.2 Ghz processor and 1 gigabyte of memory
- WDI Development and Stage environments share the same hardware as production.

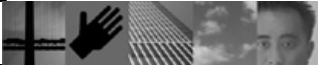
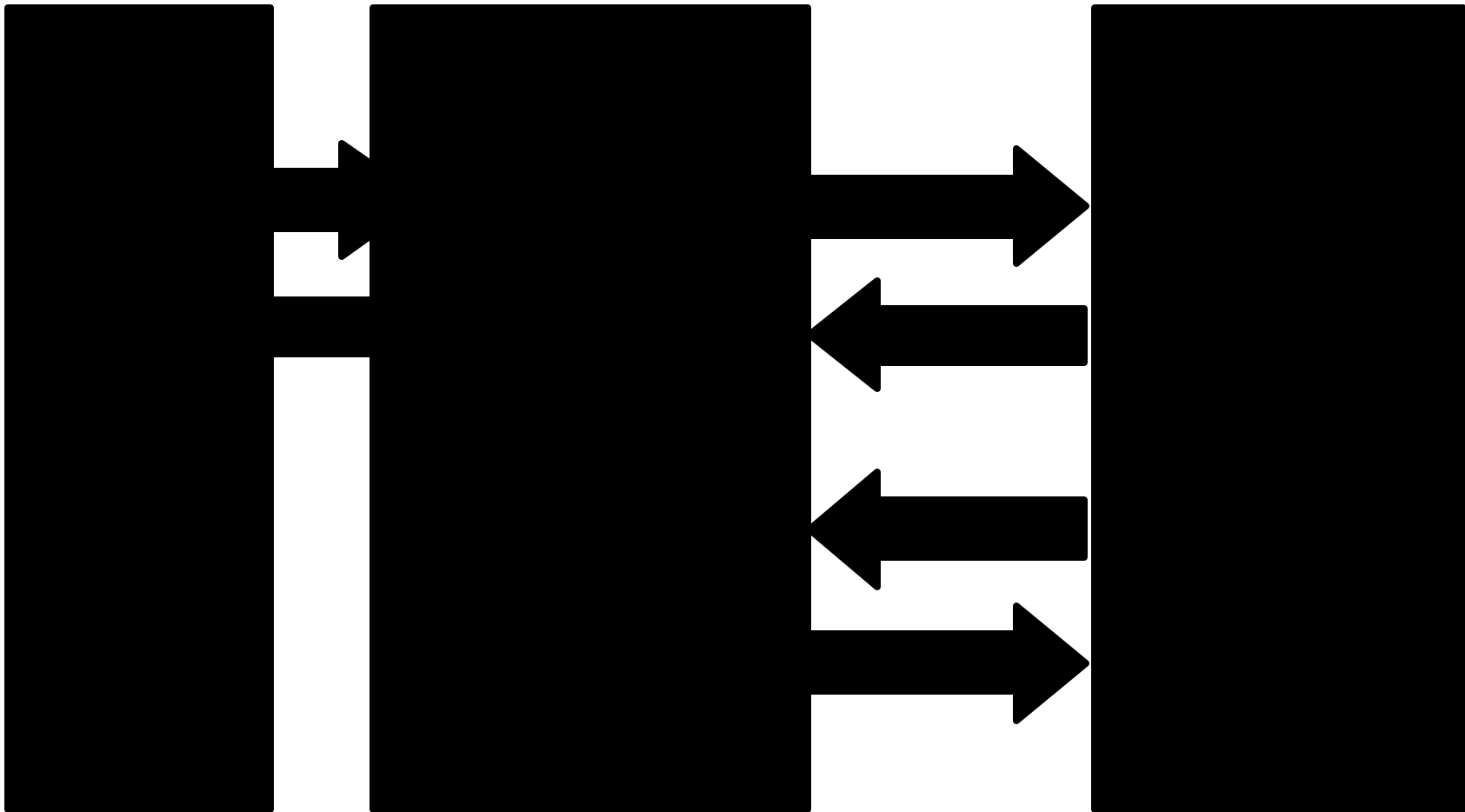


## Environment – Software

- WDI Server – WDI 3.2 SP6 for Windows 2000, standard set-up
- WBI Server – ICS 4.1.0.2 using Oracle 8.1.7 for repository database
- MQ Series – Version 5.2 on the WBI side and 5.3 on the WDI side
- Enterprise Application Integration – Various WBI adaptors
  - Includes Oracle Applications, Vantive, Clarify, and others
- EDI VAN Integration – Custom Perl scripts to encrypt/decrypt messages and transfer them to/from the VAN.
  - Custom scripts used because of the need to route messages between legacy applications, TPI, and WDI.

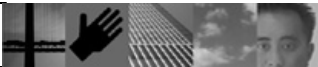


# Environment - Architecture



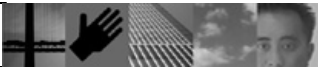
# Functional Allocation in the Architecture - WDI

- Inbound EDI Messages
  - Receiving and logging reception of EDI messages
  - Validating messages
  - Generating/sending Functional Acknowledgements
  - Mapping EDI messages to XML *generic business objects* (GBO's)
- Outbound EDI Messages
  - Mapping XML GBO's to EDI
  - Enveloping EDI messages
  - Sending/logging EDI messages
  - Logging receipt of Functional Acknowledgement in response
- **Goal: Separate EDI concerns from Business Process concerns**

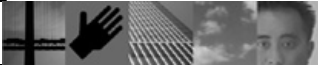
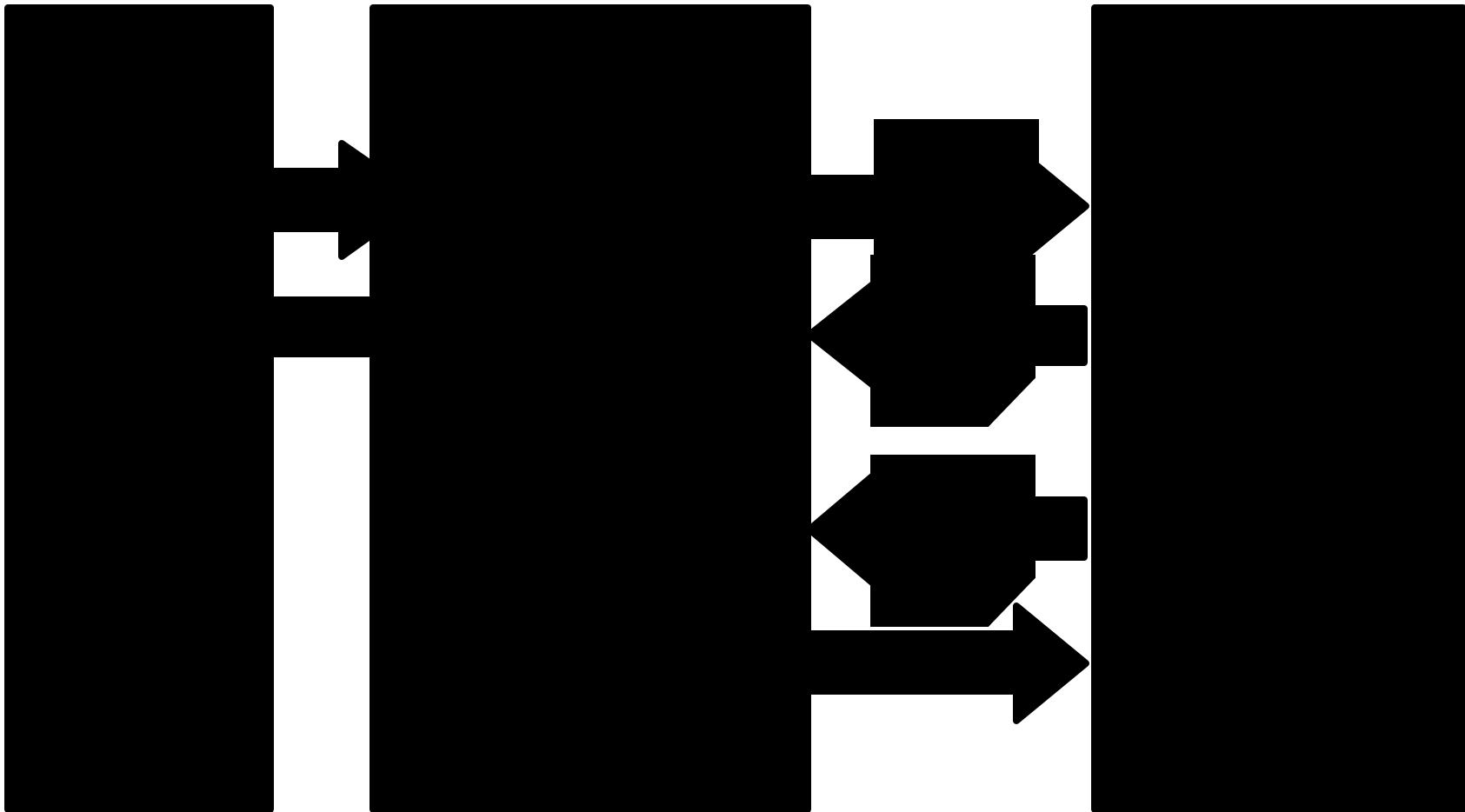


# Functional Allocation in the Architecture - WBI

- Inbound EDI Messages
  - Validate received data, possibly through look-ups to enterprise applications
  - Fill-in or modify data as needed
  - Map XML GBO's to *application-specific business objects* (ASBO's) and update back-end applications
  - Convert EDI data to human-readable form for notification or archival
- Outbound EDI Messages
  - Detect triggering events, create ASBO's
  - Map ASBO's to XML GBO's for processing
  - Validate data in GBO's, filling-in or modifying as needed through look-ups to enterprise applications

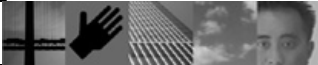


# Execution Model - Inbound



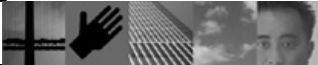
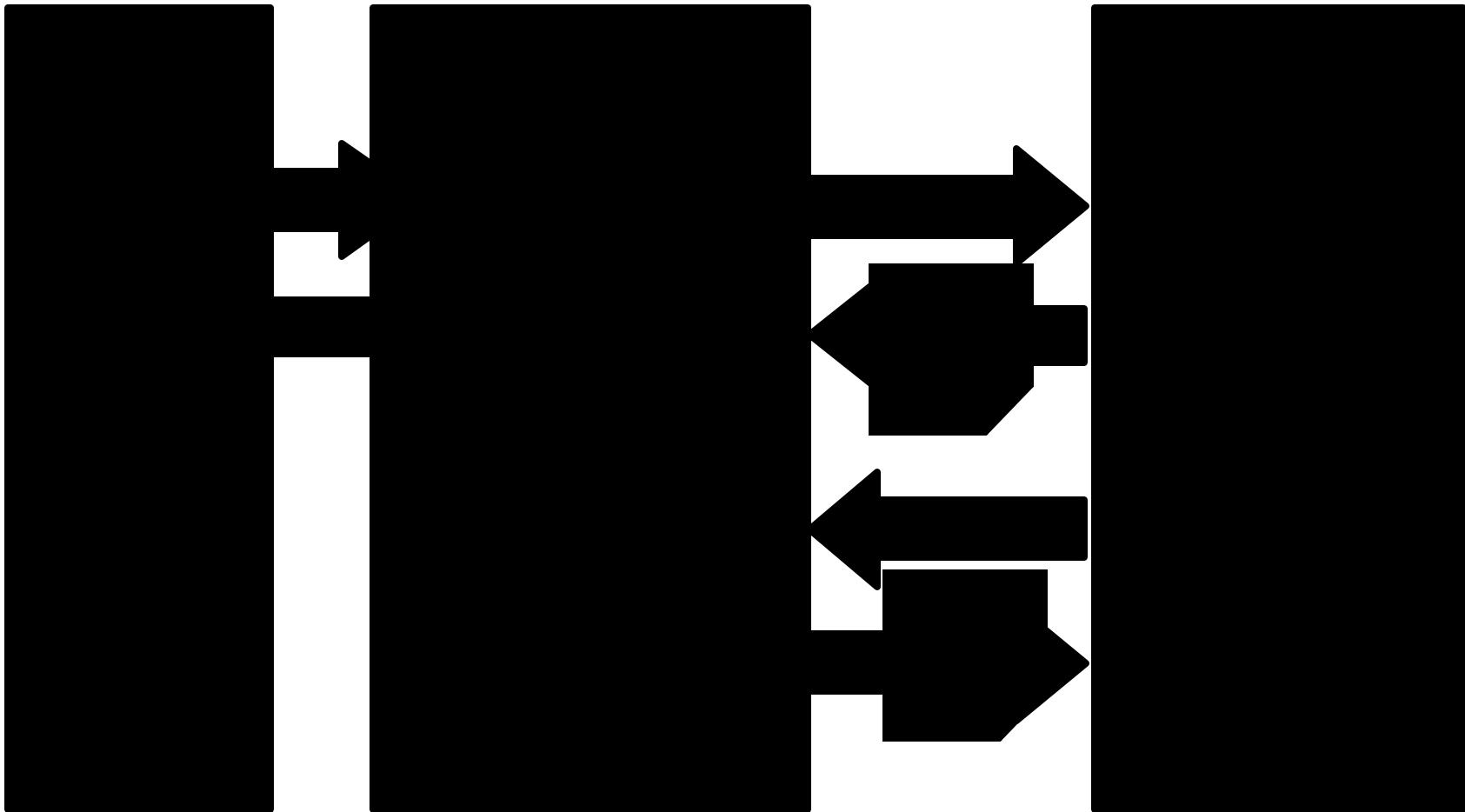
# Execution Model – Inbound

- WDI
  - Script downloads EDI messages from VAN and sends them to WDI
  - WDI maps EDI to XML GBO (Generic Business Object)
  - WDI sends GBO to WBI via MQSeries
- WBI
  - WBI MQSeries adaptor picks up GBO and sends to subscribing collaborations (executable business processes) on WBI Server
  - Each collaboration validates and fills in data as needed, and sends GBO to destination adaptors
  - Adaptors map GBO to appropriate ASBO (Application-Specific Business Object)
  - Adaptors send ASBO to destination applications



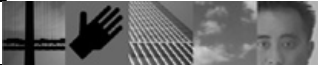


# Execution Model - Outbound



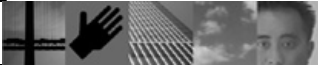
# Execution Model – Outbound

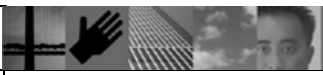
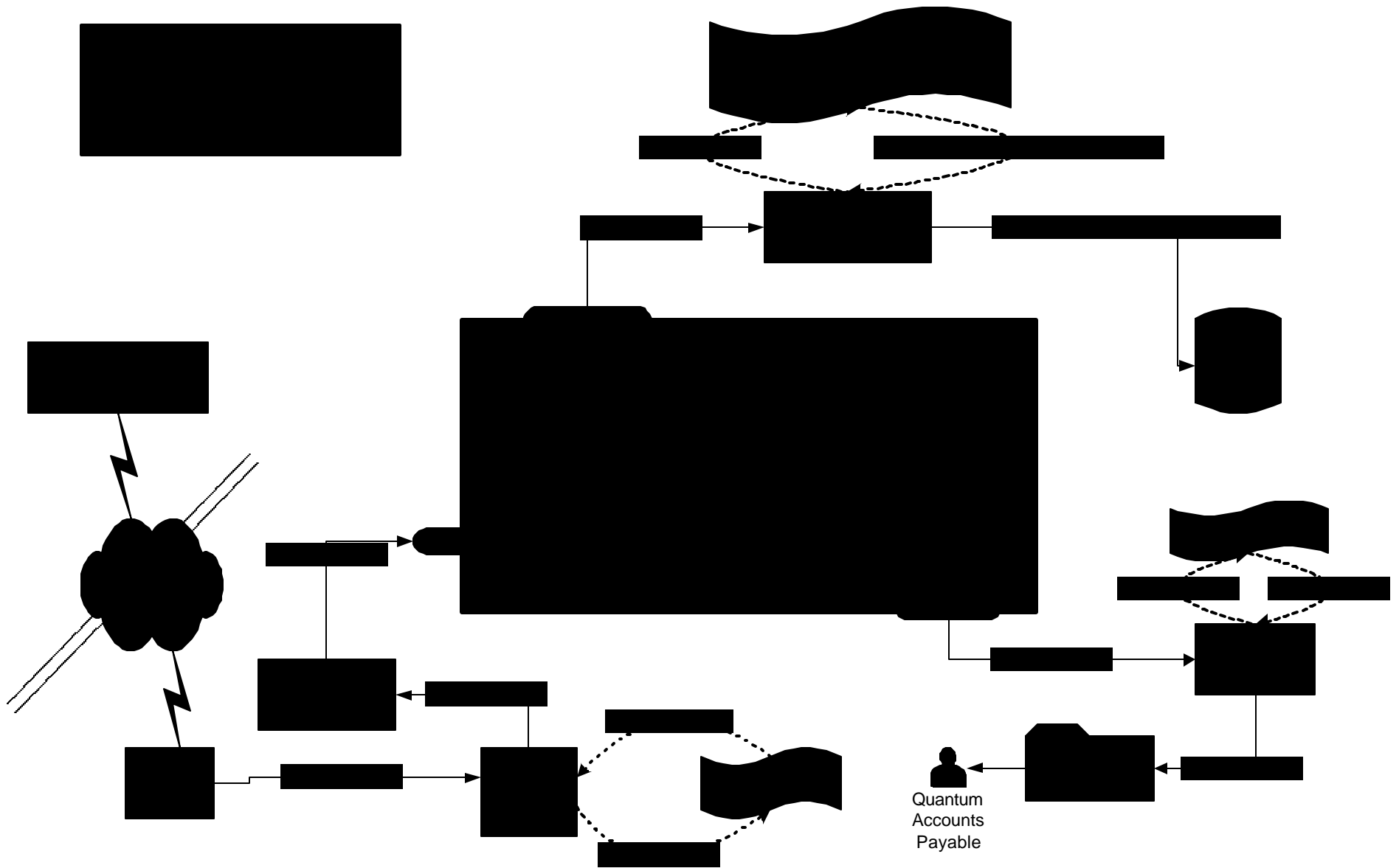
- WBI
  - A WBI adaptor detects triggering event, possibly via a bridge, and creates an ASBO from it
  - Adaptor maps ASBO to GBO and sends to subscribing collaborations on WBI server
  - Each collaboration validates and fills in data as needed, and sends GBO to destination adaptors, i.e. WDI MQSeries adaptors
- WDI
  - WDI picks up GBO, maps it to EDI, and queues it for transmission
  - Custom script picks up EDI message and sends it to the VAN



## Development Process - Iterative

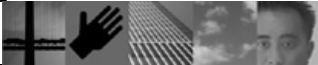
- Requirements Phase
  - Business-level requirements gathered
  - EDI Guidelines for involved messages acquired
  - Business-level Use Case created
- Analysis & Design Phase
  - *CrossWorlds Integration Architecture Diagram (CIAD)* created
  - System-Level Use Case created
  - Use Cases and CIAD reviewed, revised as needed
  - System-Level data requirements verified.





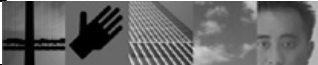
## Development Process (cont.)

- Construction
  - Business objects (including XML Document Type Definitions) created
  - Application *bridges* (data translation scripts) created
  - WDI and WBI maps and End-to-End Mapping Document created
  - WBI collaboration templates and collaboration objects created
  - WBI adaptors created/configured
- Testing
  - Bridges, maps, collaborations, and adaptors unit-tested
  - End-to-End Integration Testing
  - User Acceptance Testing (UAT)



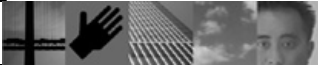
## Development Process (cont.)

- Deployment
  - Application bridges and WBI/WDI code deployed to production servers
  - Production configuration of bridges, adaptors, and collaboration objects
  - All components activated and supporting jobs scheduled
  - Deployment monitored



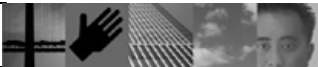
# Operations Support

- Monitoring
  - Application bridges and WBI adaptors flag connection or data errors
  - The WBI ICS flags processing errors
  - Custom scripts monitor system logs and some system components
  - Our VAN monitors problems with EDI messages and transmissions
- Notification
  - Scripts and WBI components generate notification emails to Quantum EDI Administrators when they detect errors



## Operations Support (cont.)

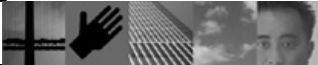
- Recovery
  - WBI suspends processing failures in the ICS as “failed flows”
  - A WBI administrator troubleshoots the problem
    - WBI tools allow WBI administrators to browse failed flows, read errors messages, look at the state of in-process business objects, make code changes, and restart or discard the failed flows
  - Problems are usually corrected and the affected flows are restarted
  - Occasionally flows are discarded and the messages are corrected and resubmitted from the source applications





## Lessons Learned

- WDI Strengths
- WBI Strengths
- A distributed system has pros and cons
- Choose a good VAN
- Reuse existing work whenever possible
  - Application Interfaces
  - EDI Message Formats
  - Development Languages (Java, XML, Perl)
  - Development Artifacts (Processes, Components, etc.)
- Develop new artifacts to extend or fill gaps in existing work
  - Ex) Application bridges, Formatted Data Handler



## Future Work

- TPI to the VAN
  - Provide a single gateway to the outside world
- Develop a general XML Gateway to our ERP
  - Moving towards XML as the standard interface data format for enterprise application integration
- Develop RosettaNet or other standard XML B2B transactions
  - Moving towards XML as the standard interface data format for inter-enterprise integration
- Build a Quantum EDI portal
  - Provide users/customers with intranet/extranet access to EDI system status and transaction information

