DataAccessTechnologies

Where Business Meets Technology

Business Service Oriented Architecture

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Case Study
U.S. General Services Administration (GSA)

Customer: GSA OCIO

Provider: LMI & Data Access Technologies

Tooling: Component-X, Magicdraw UML, OsEra

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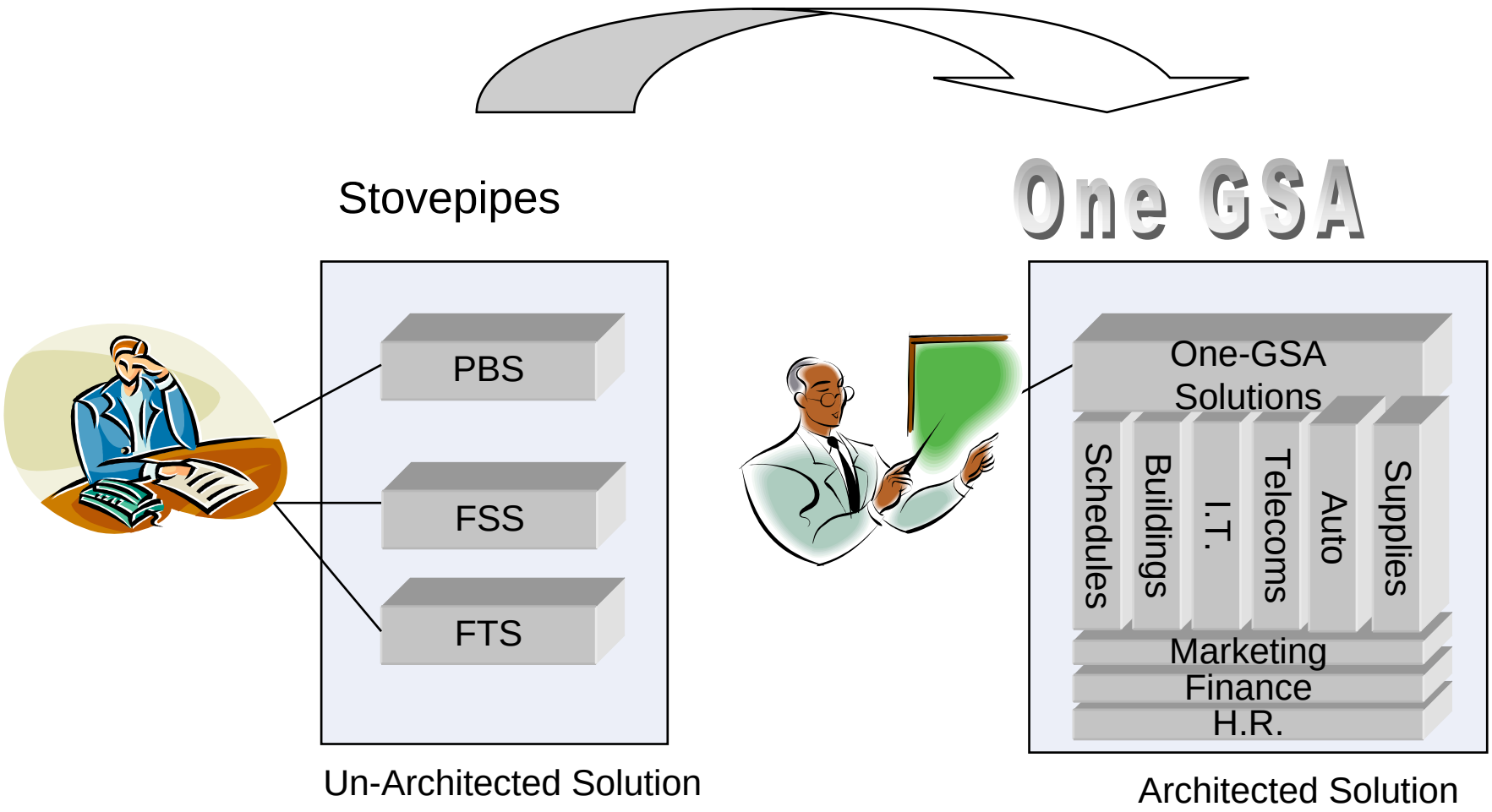
One-GSA Initiative



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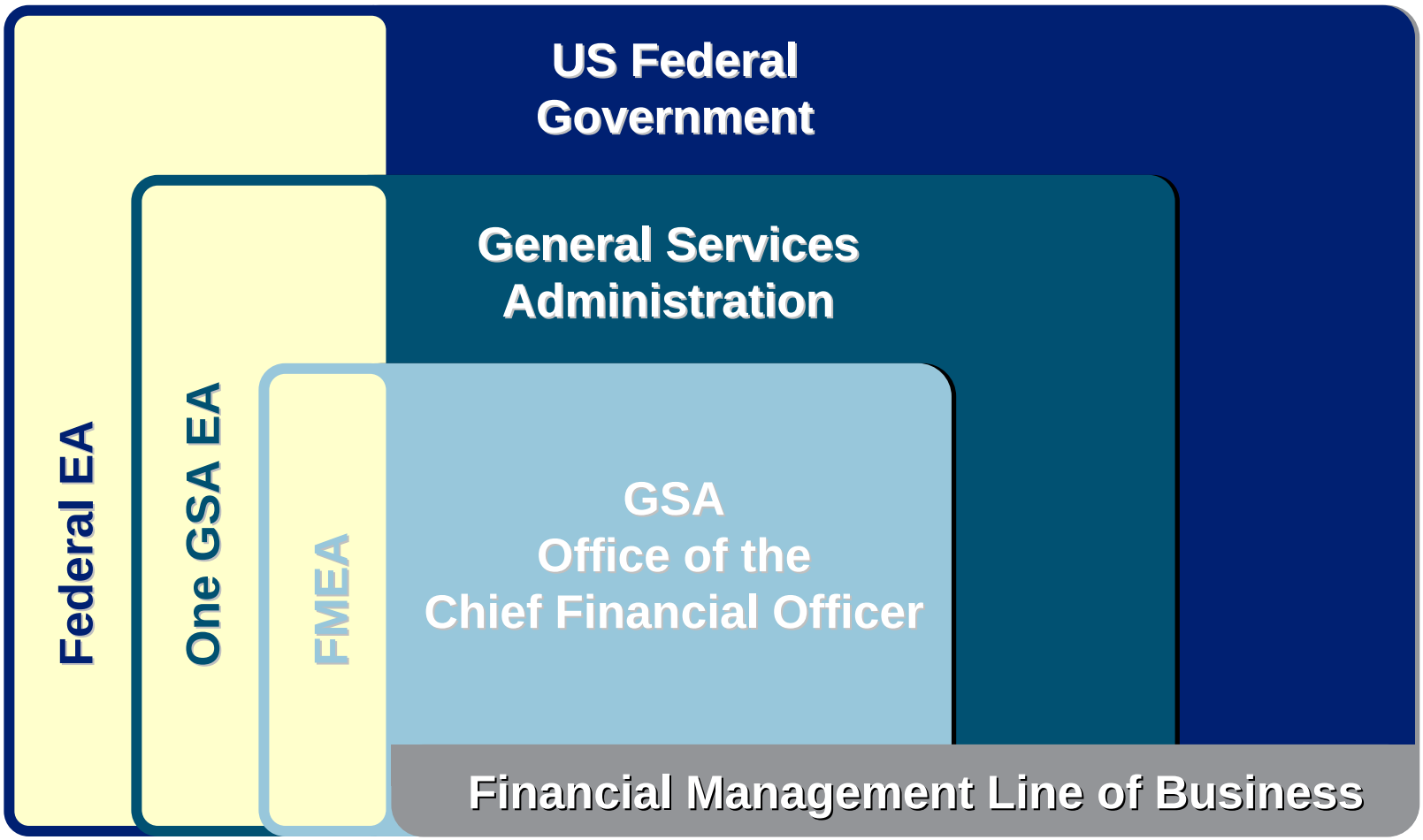
Where Business Meets Technology

FMEA
A Business Service Oriented Architecture for the Financial Management Line of Business

Background

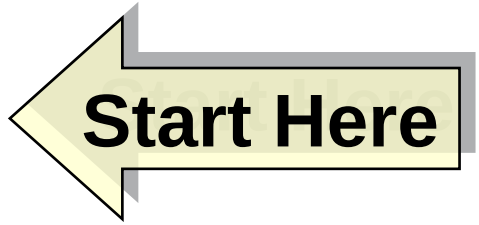
- The Financial Management Enterprise Architecture (FMEA) project was sponsored by the US General Services Administration (GSA) Offices of the Chief Information Officer and Chief Financial Officer.
- The project was carried out under the umbrella of the “One GSA” Enterprise Architecture program.
- Project deliverables included:
  - A target business architecture for consistent and comprehensive financial management supporting all GSA services and staff offices.
  - A logical system architecture for a cohesive financial management suite supporting the business architecture, particularly in areas in which a transition needed to be made off legacy systems.
  - A set of interface definitions to act as the basis for a standard GSA financial management service-oriented architecture.

FMEA in Context



Model Driven Architecture

MDA as defined for GSA Enterprise Architecture work

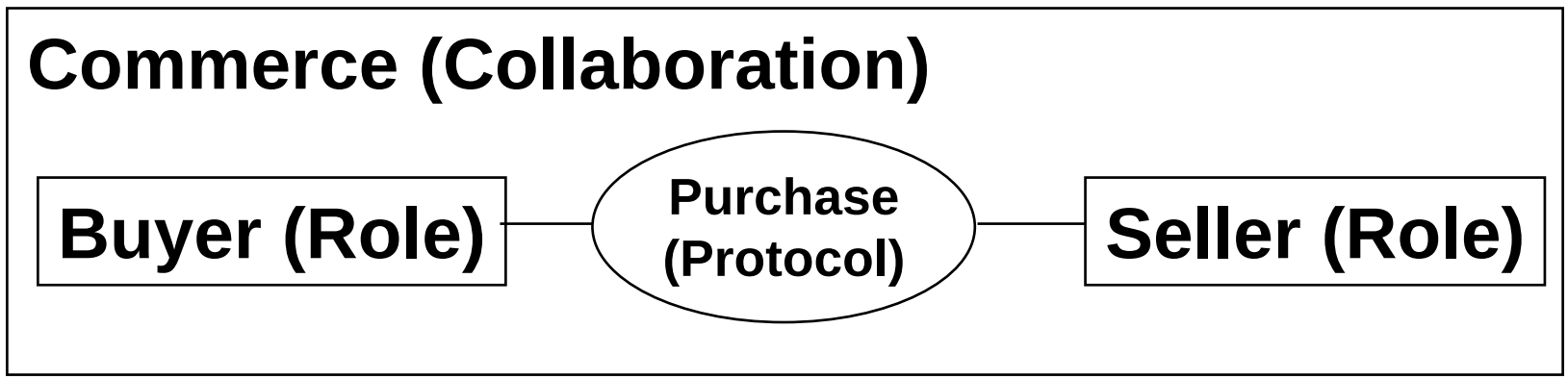


- Computation Independent Model (CIM)
  - The business model
- Platform Independent Model (PIM)
  - Technology independent system specification
  - Conforms to the business model (CIM)
- Platform Specific Model (PSM)
  - Technology specific (e.g., middleware, application platform, etc.) system design
  - Conforms to the system specification (PIM)

- Automate where possible, maintain line of sight throughout

Roles and Collaborations

- **Role:** A specification of the responsibility to perform specific functions in the context of a business process.
- **Collaboration:** A closed set of roles interacting to carry out a business process to achieve some joint purpose.
- **Protocol:** A defined conversation between two roles that may be extended over time (i.e., responses of one party to the other may not be immediate).



Kinds of Roles

- **Business Role:** A role played by a business organization in a specific business environment in which business processes emerge collaboratively, rather than by being managed by any single composite entity.
- **Discipline Role:** A role with responsibility for a major business "discipline" within a business organization, independently of the current physical organizational structure of that business.
- **Enterprise Role:** A role with top-level enterprise responsibility for some set of related business services provided within a certain discipline.
- **Work Role:** A role responsible for carrying out one or more business services within an enterprise role, at roughly the level that could be assigned to an individual worker or supported by a specific function in an information system.

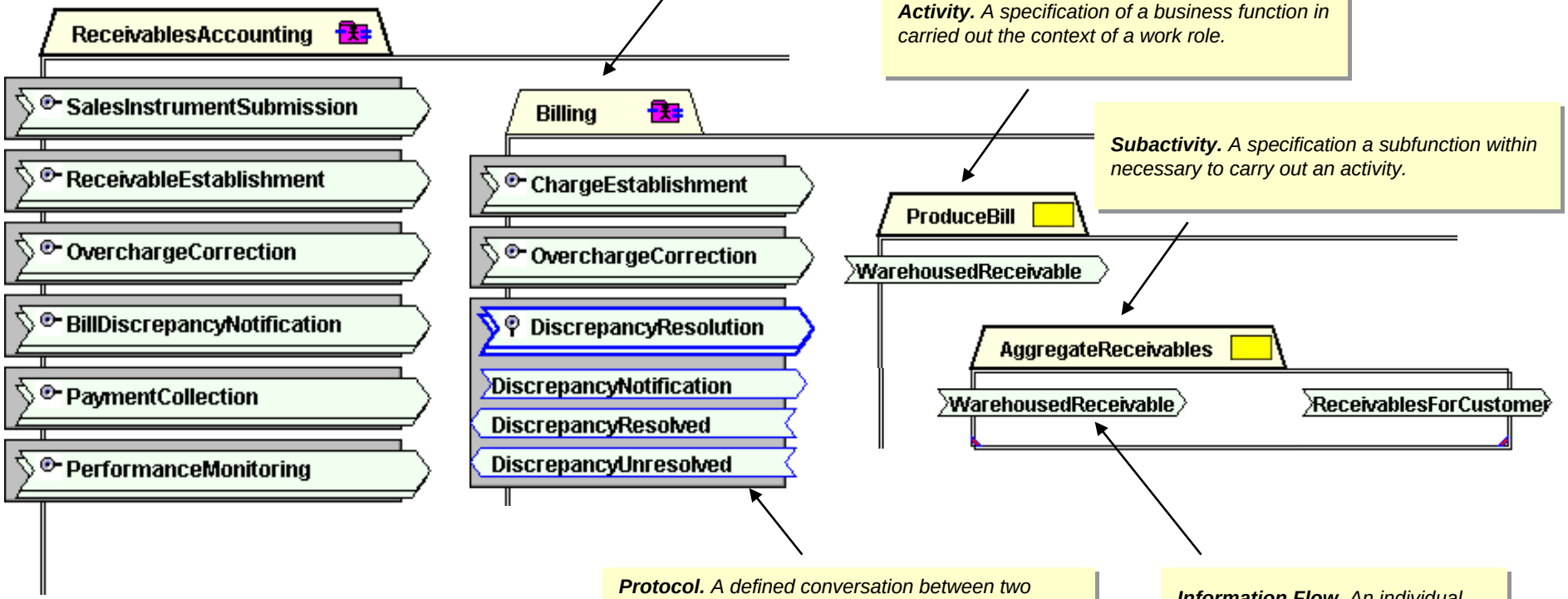
Collaborative Process Model

Enterprise Role. *A major area of functional responsibility within the discipline of financial management.*

Work Role. *A role responsible for a specific functional area within an enterprise role, such as might be assigned to a single worker or supported by an IT system.*

Activity. *A specification of a business function in carried out the context of a work role.*

Subactivity. *A specification a subfunction within necessary to carry out an activity.*



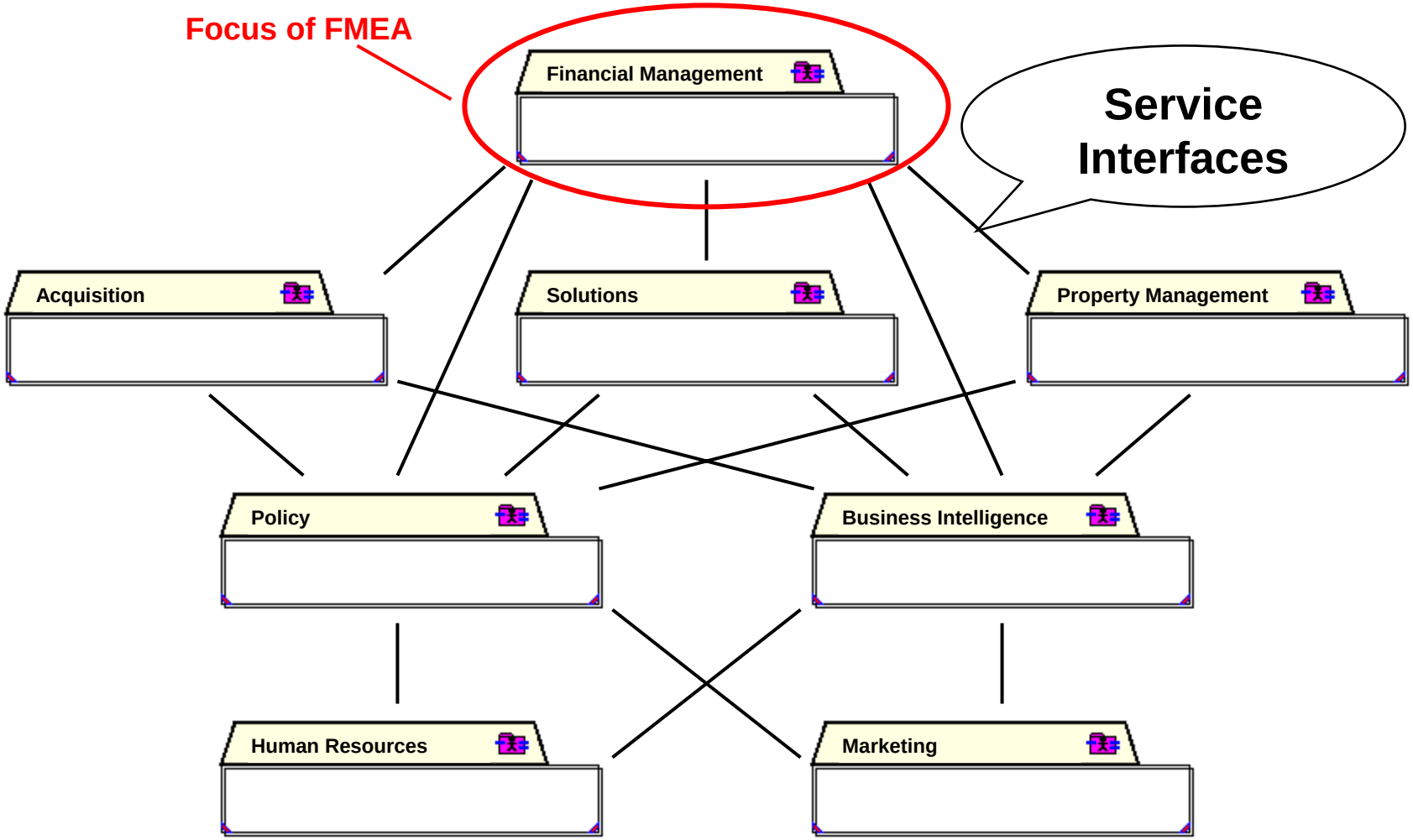
Protocol. *A defined conversation between two roles that may be extended over time. One role initiates and the other responds to the protocol, but information may flow both ways across the protocol.*

Information Flow. *An individual flow of information across a protocol or into or out of an activity.*

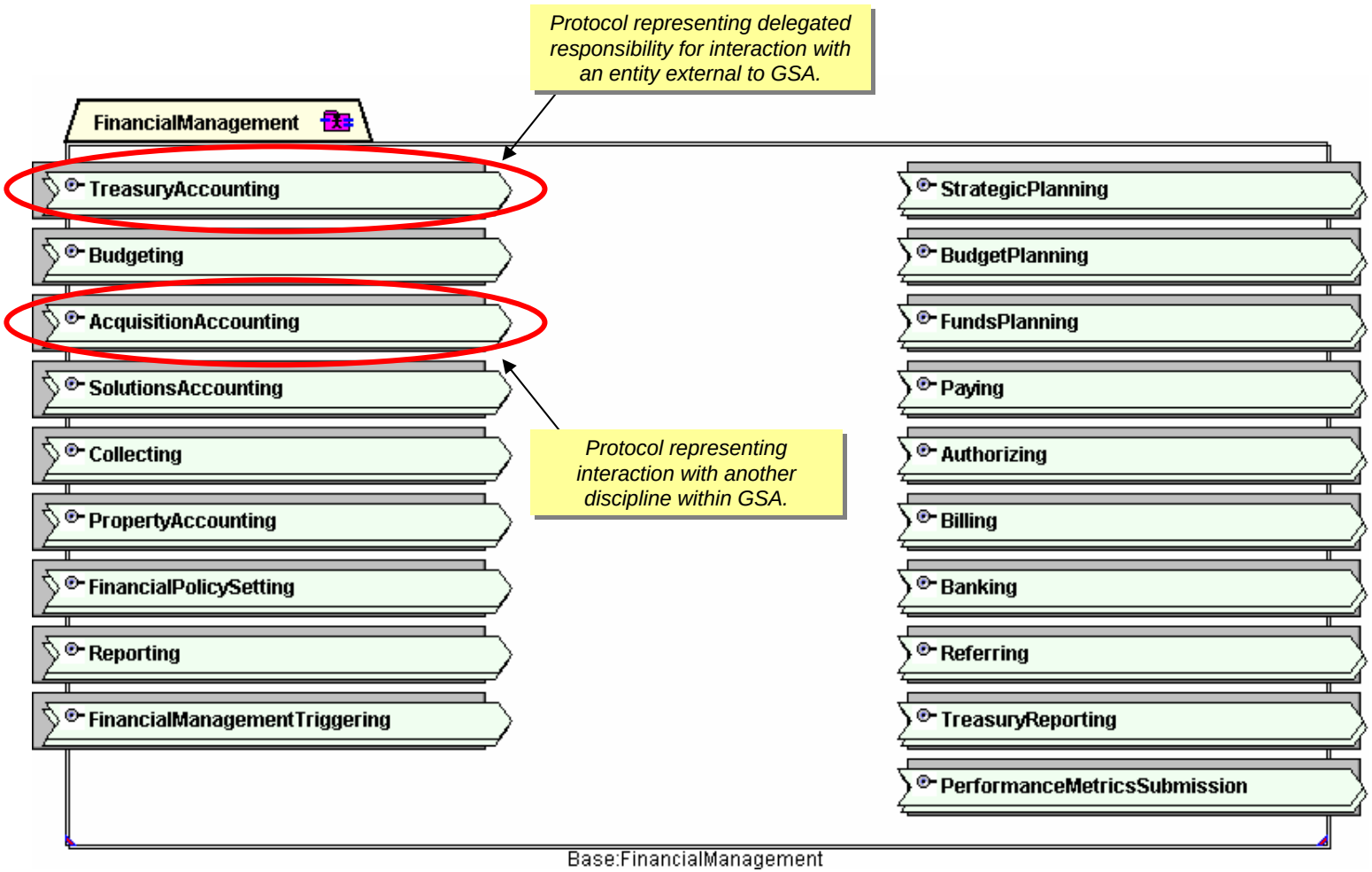
The enterprise as services

- Think about the enterprise as a set of interacting roles providing and using services enables agility and an effective transition framework
- Externally
  - The enterprise is part of the global supply chain, providing services to customers and using the services of suppliers
- Internally
  - Consider parts of the enterprise as providing services to other parts of the enterprise, and in term using the service of others
  - Like everything was outsourced as a service, it just happens to be done inside the organization.
- Business is modeled in terms of interacting roles – providing and using services – the essential concepts of business SOA

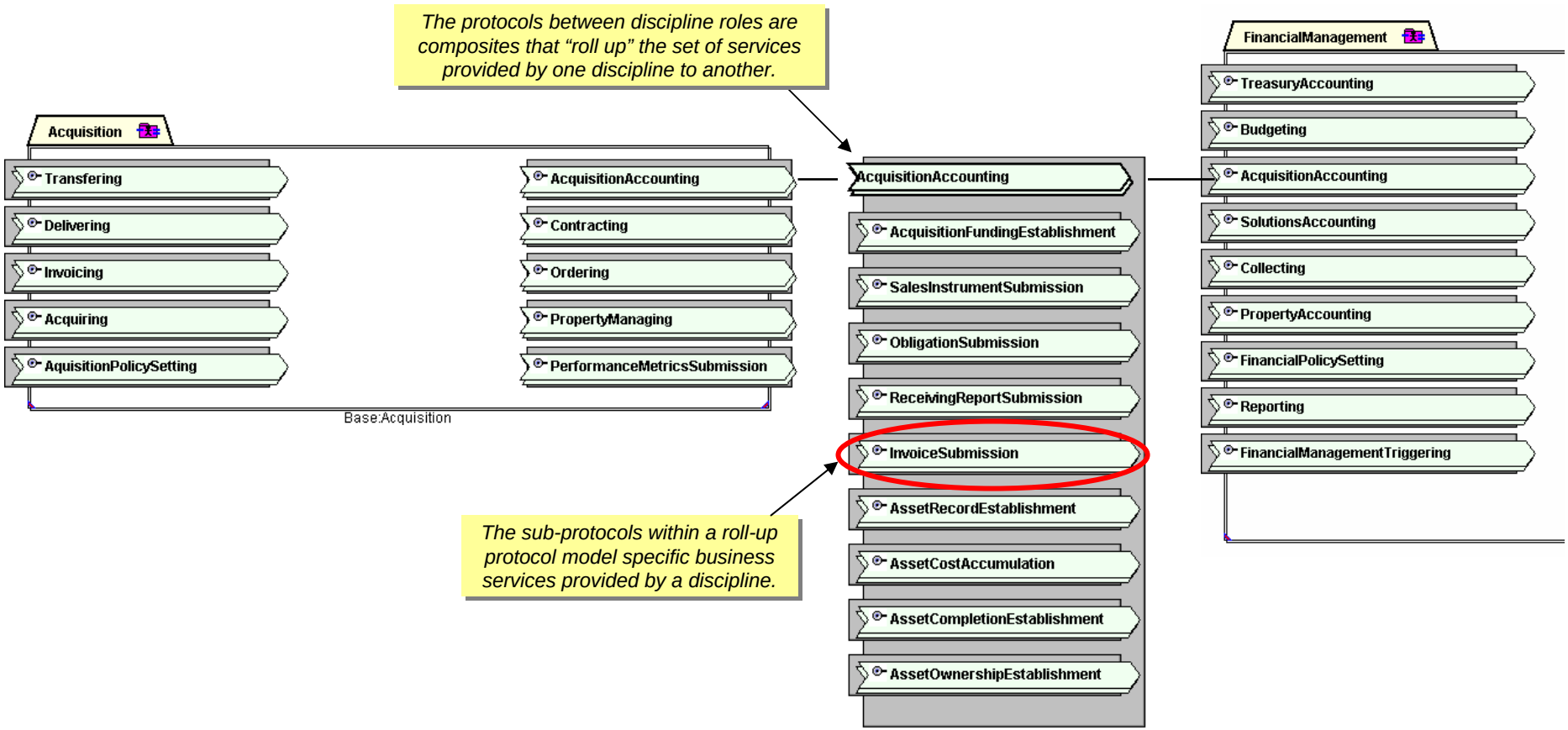
“One GSA” Disciplines (Simplified View)



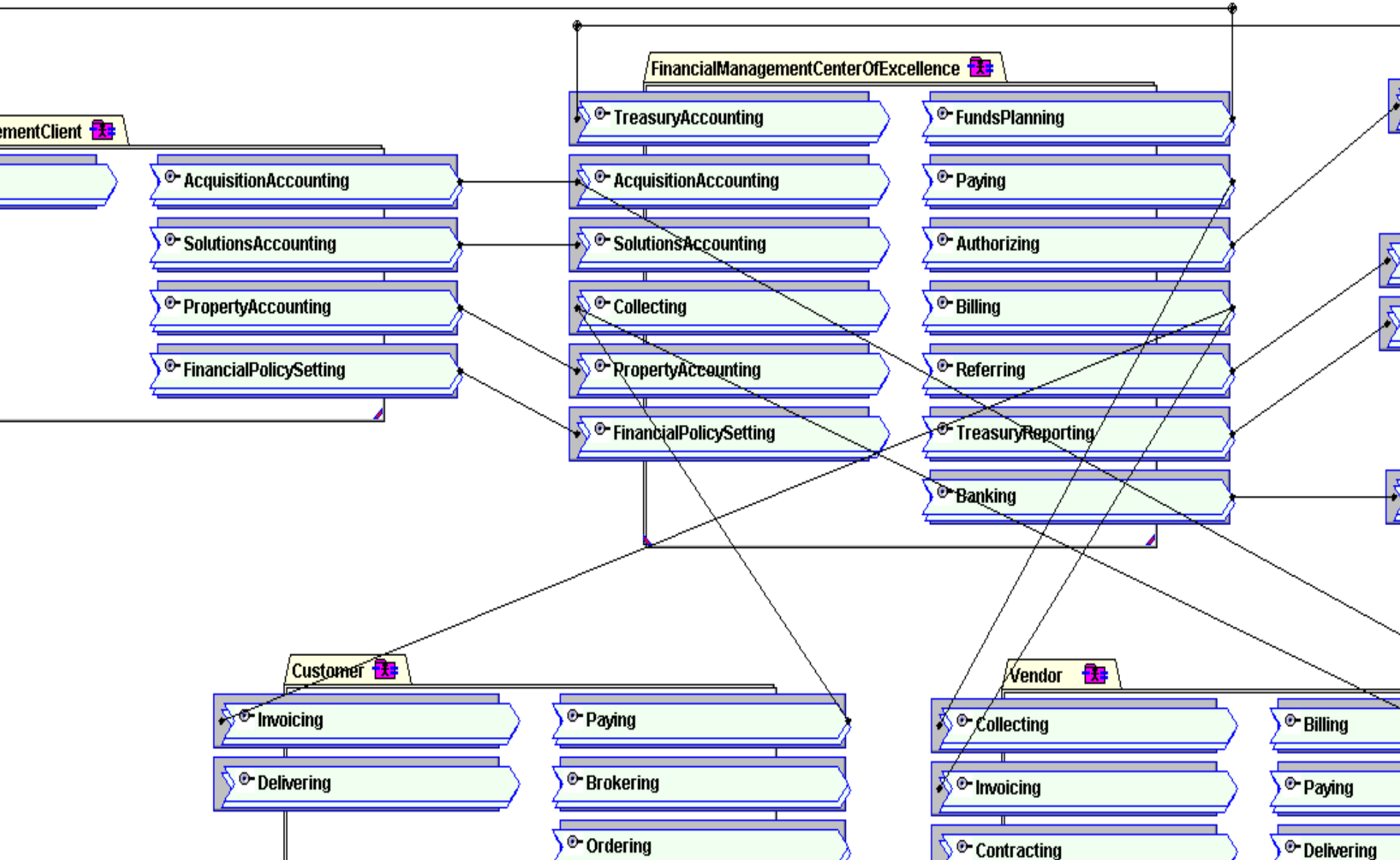
Financial Management Discipline Role



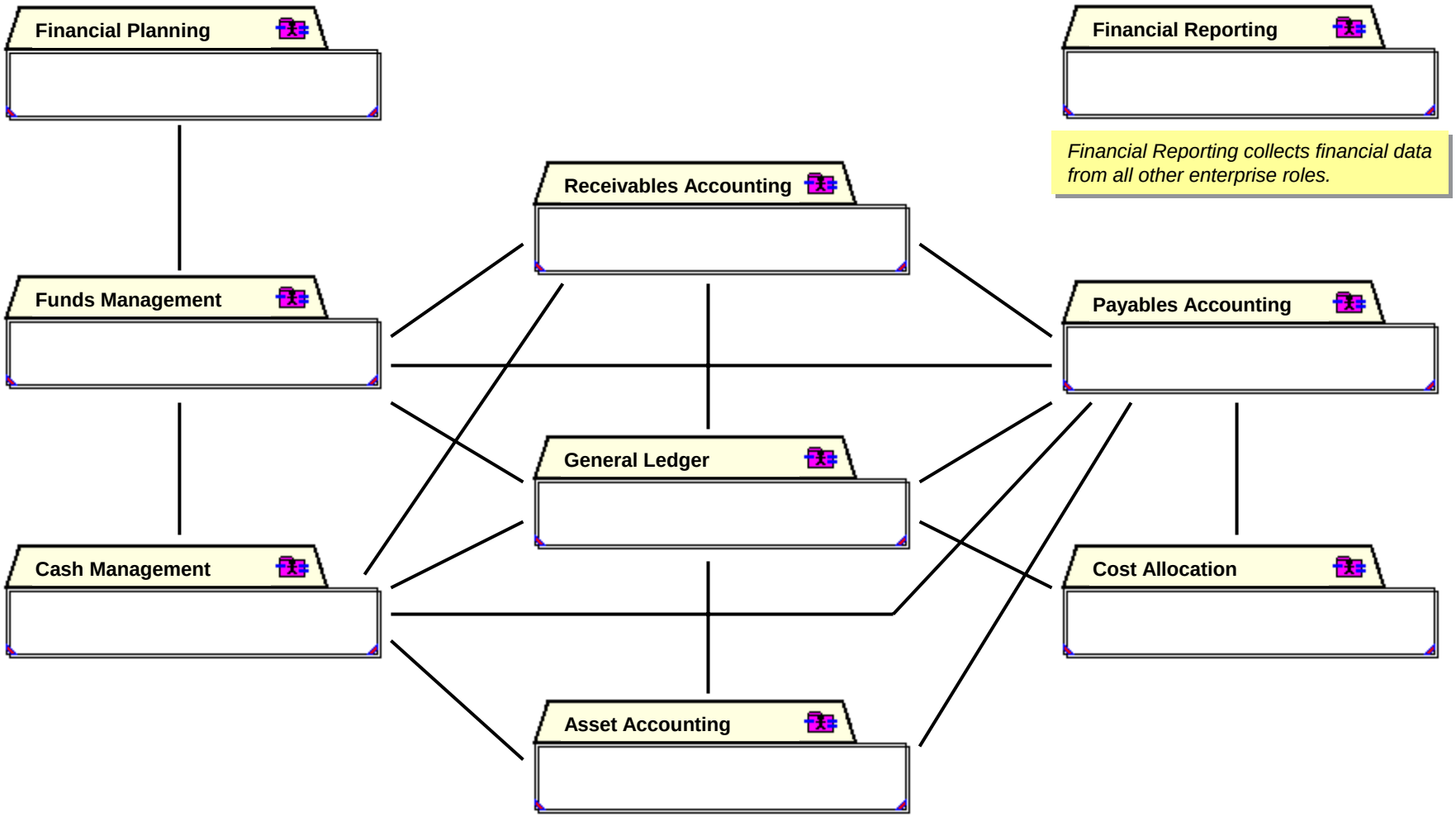
Service Delivery Protocol



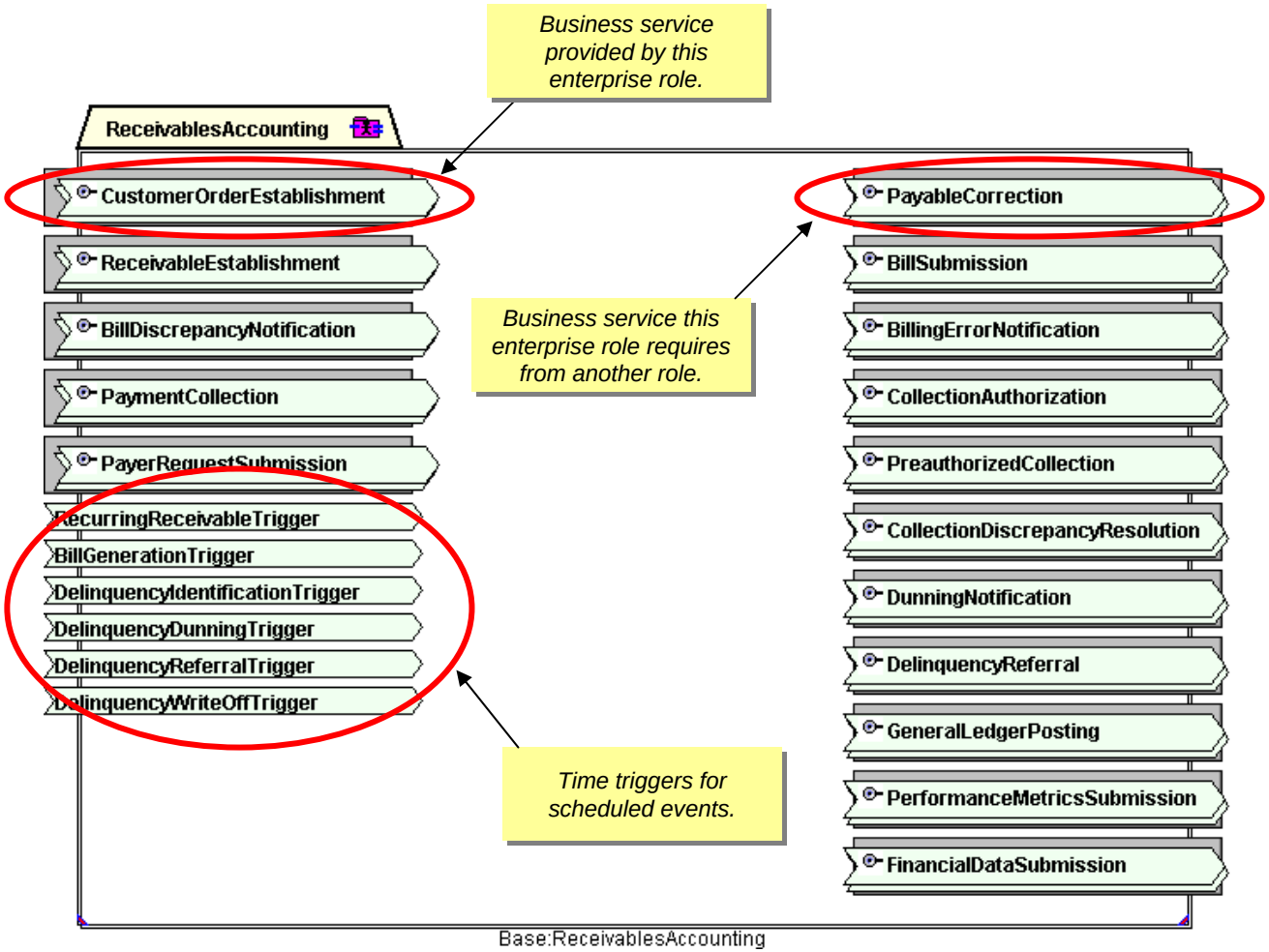
“FM LOB” Business Environment



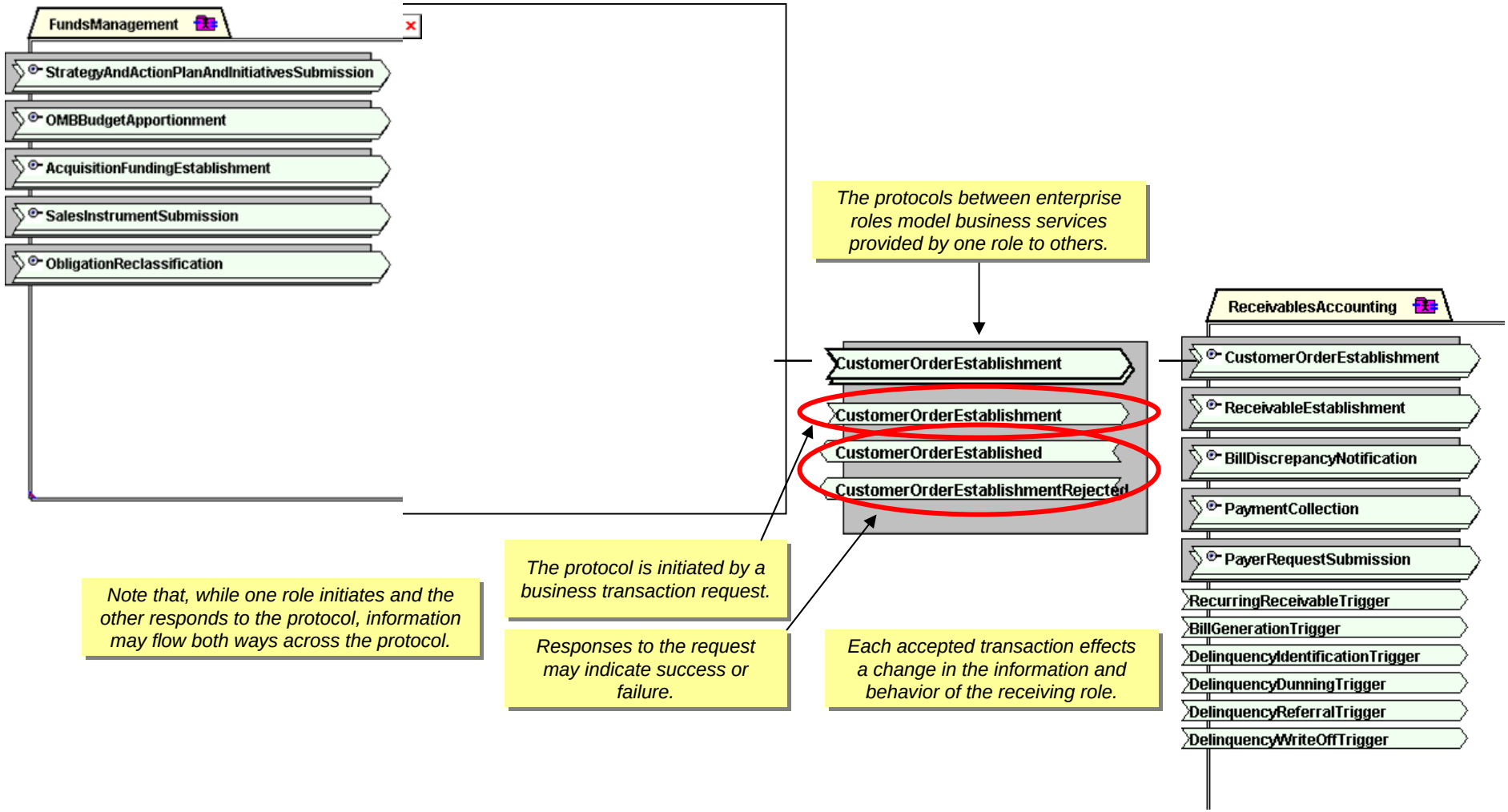
Financial Management Enterprise Roles (Simplified)



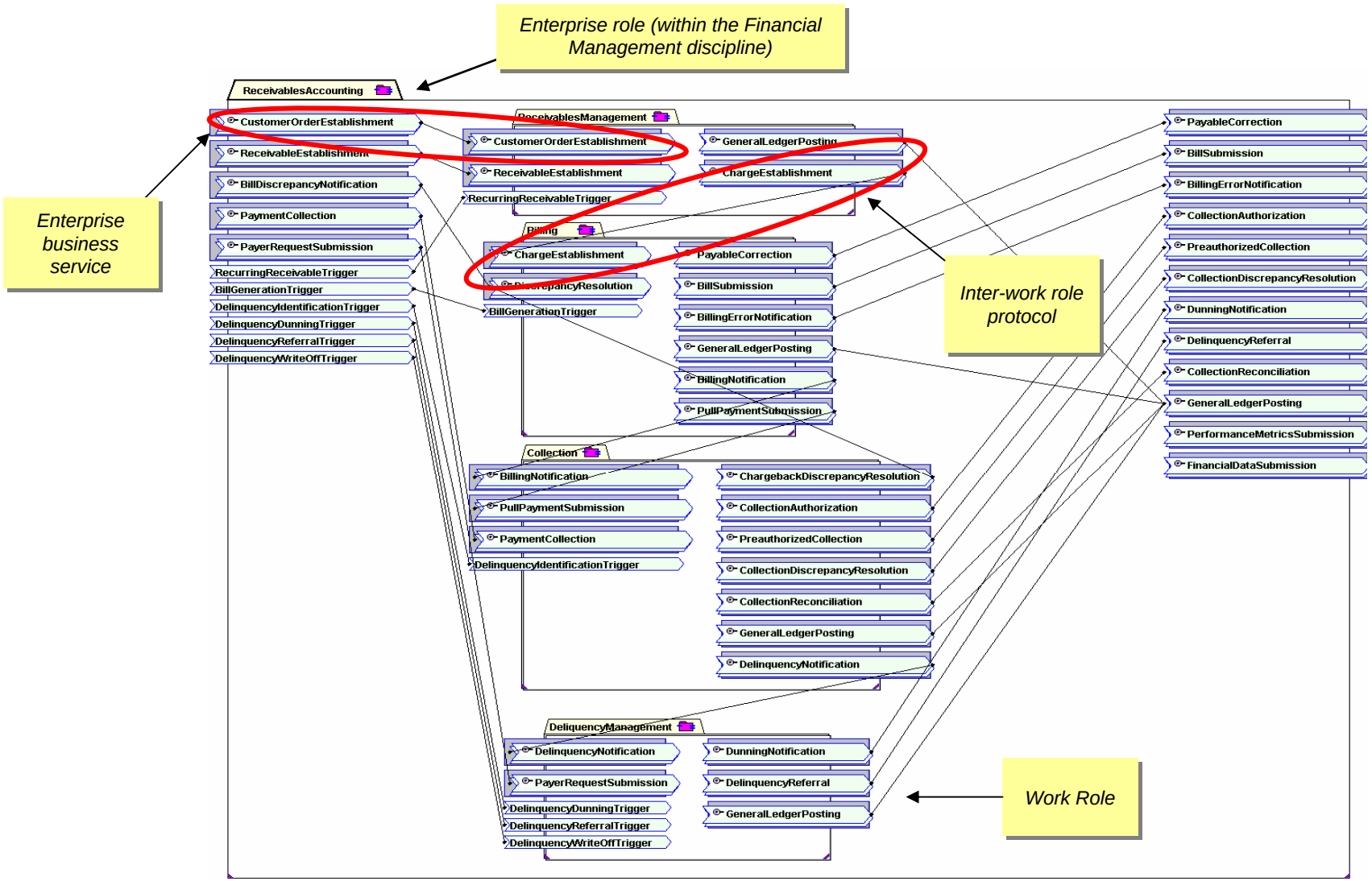
Example Enterprise Role



Example Business Service Protocol



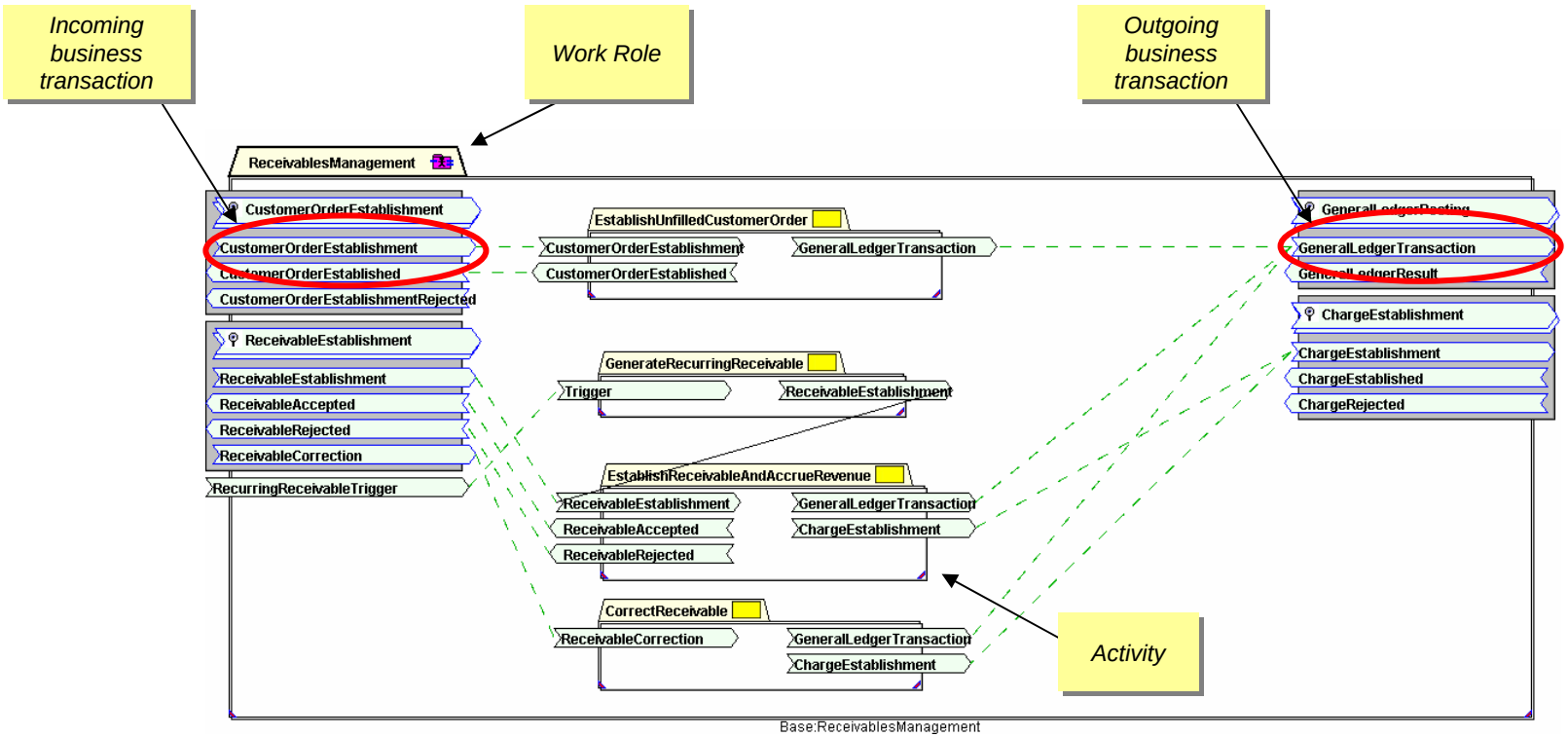
Example Work Roles – Delegation of Responsibility



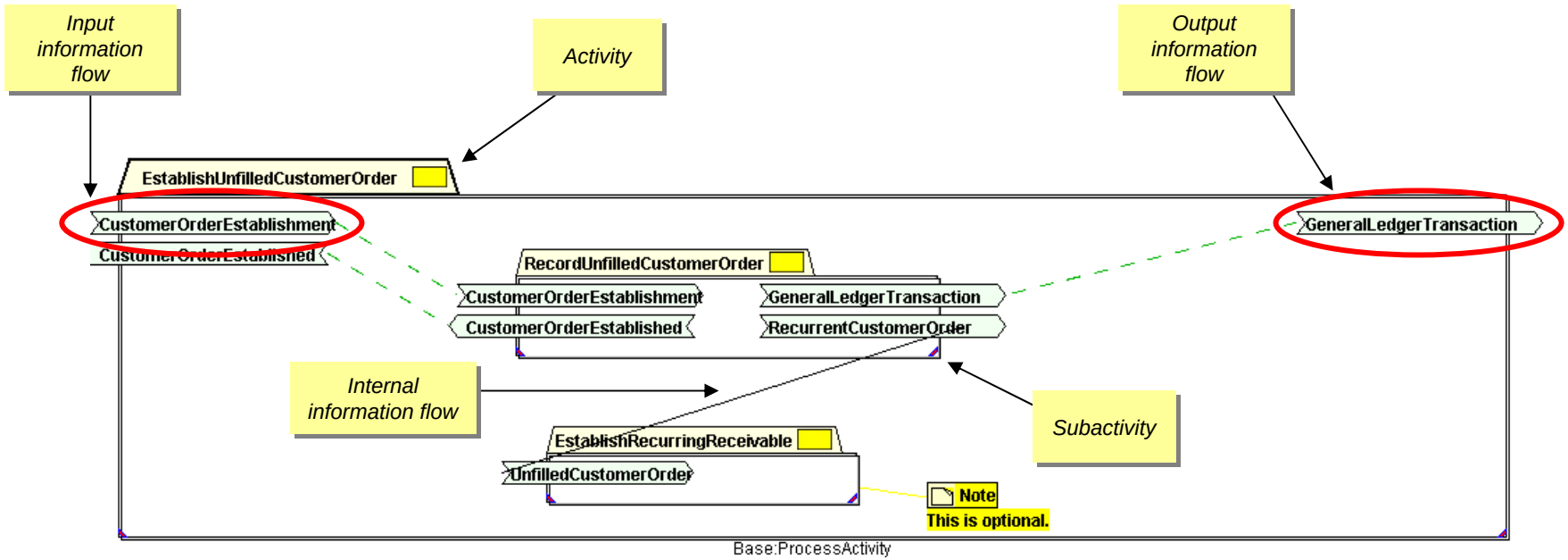
Activities and Choreographies

- **Activity:** A specification of a business function in the context of a role.
- **Choreography**: A specification of the sequencing of external interactions required in order to carry out given business responsibilities.
  - A work role is choreographed in terms of the activities required to perform the business services provided by the work role.
  - A complicated activity may be choreographed in terms of subactivities.
  - A subactivity (or simple activity without subactivity decomposition) is choreographed directly in terms of the event-triggered sequencing of its acceptance of inputs and sending of outputs.

Example Activities



Example Subactivities



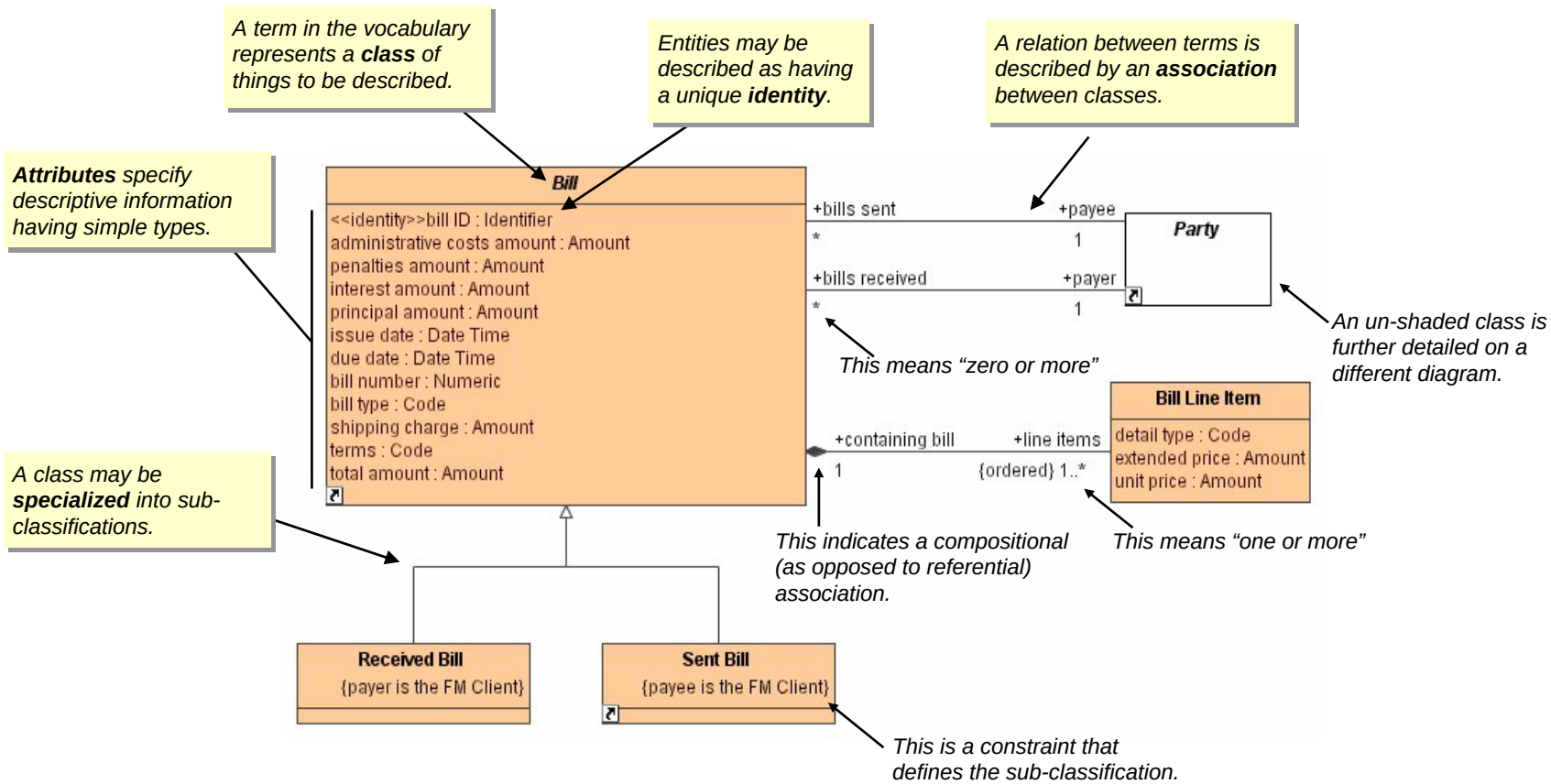
Example Subactivity Requirements

Description: Record a new unfilled customer order, as established via a specific sales instrument.
Generate general ledger transactions to increase Unfilled Customer Orders and decrease Anticipated Reimbursements.

Requirement

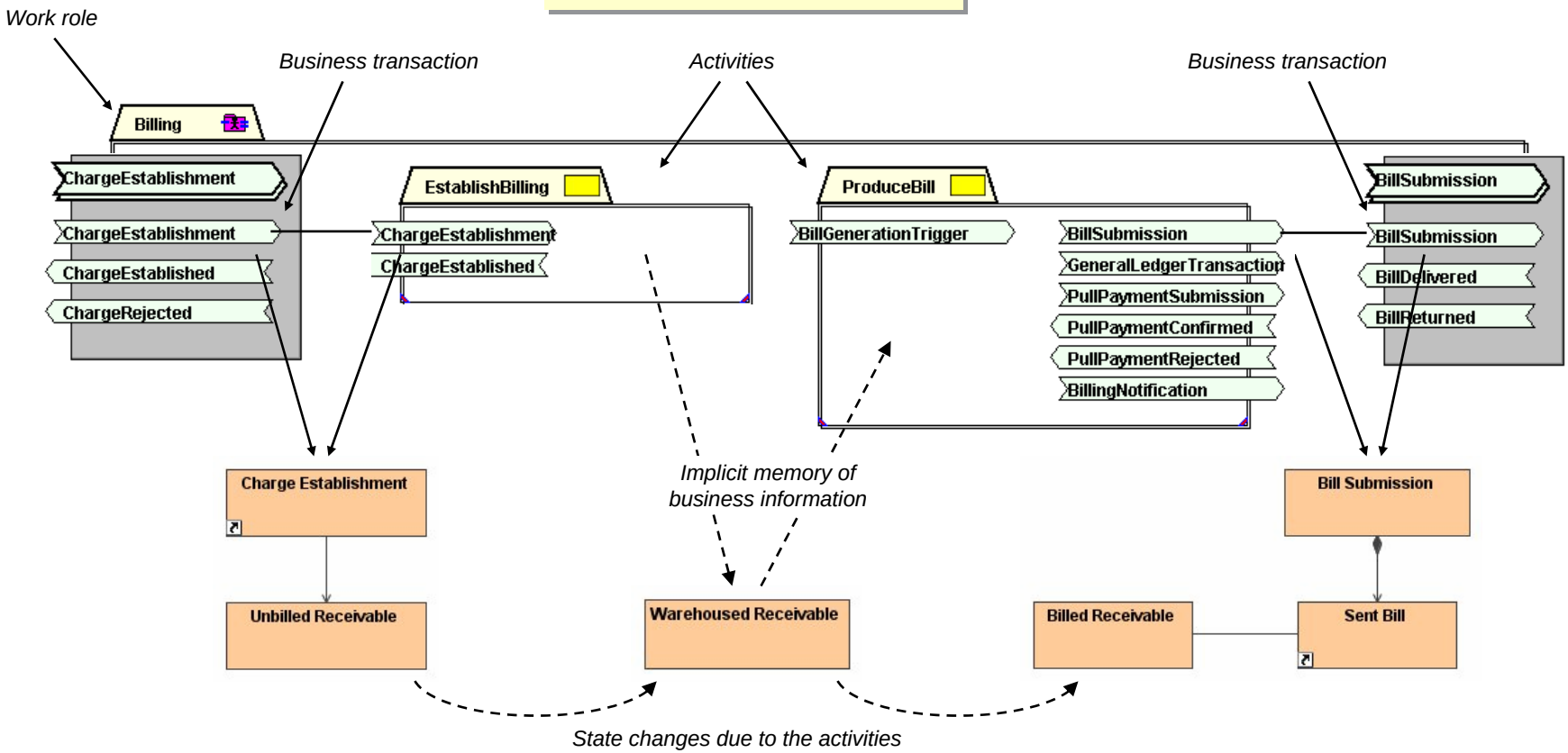
RMA-03	Reimbursable agreement information. Capture and accumulate reimbursable agreement information that includes the following: * Billing limit * Billing terms * Customer order amount * Amount obligated * Amount expended * Advances collected * Advances applied to earned revenue * Remaining balance on advances * Amount earned * Amount billed * Accounts receivable * Collections on receivables. Enable access to reimbursable agreement information by customer ID number, reimbursable agreement number, project, or fund.	JFMIP Core Requirements 2005

Information Model



Information Model: What Is It For?

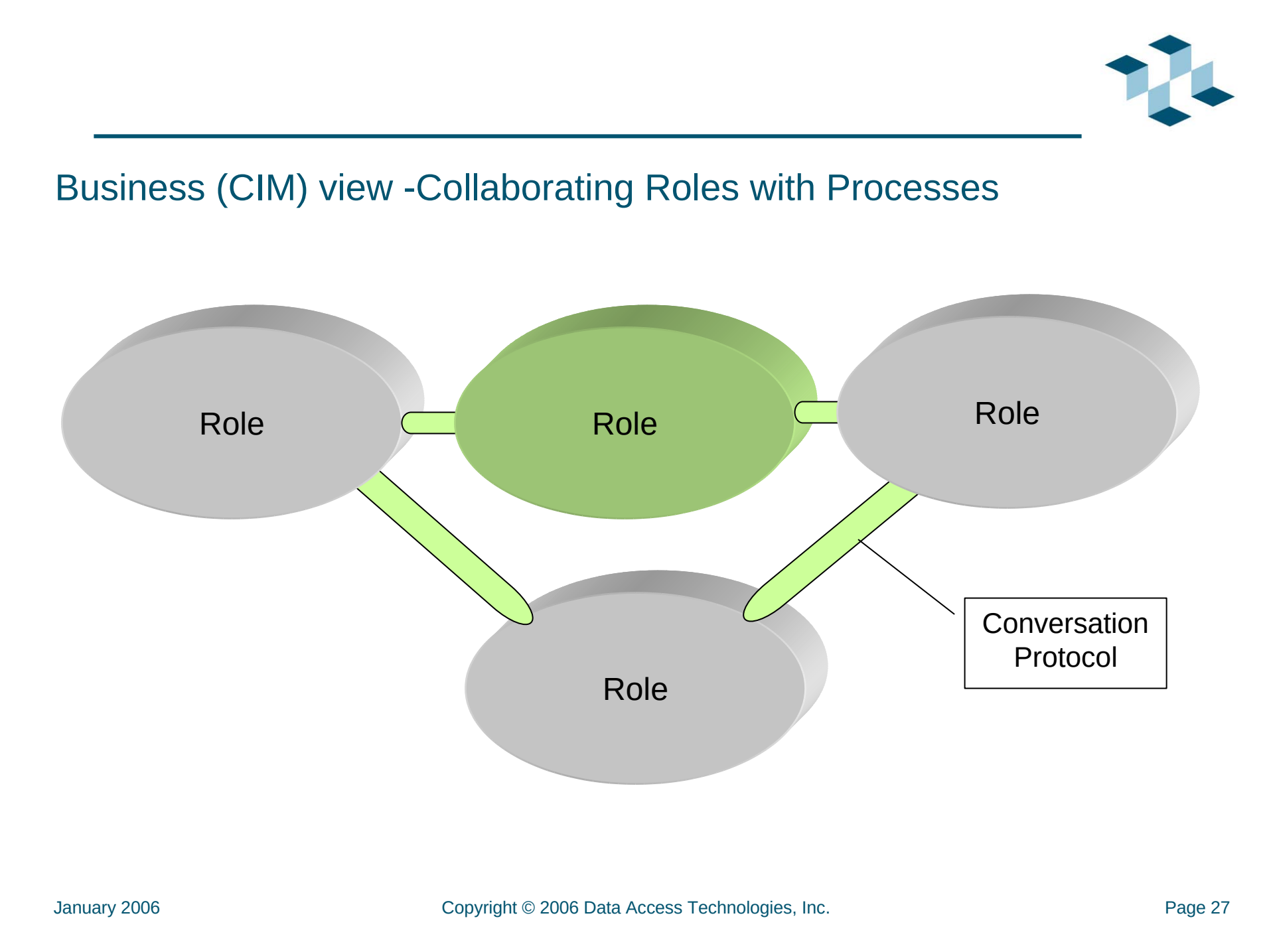
*The **process model** describes how business activities are (or are to be) carried out.*



*The **information model** details the vocabulary of the business entities and transactions used in the process model.*

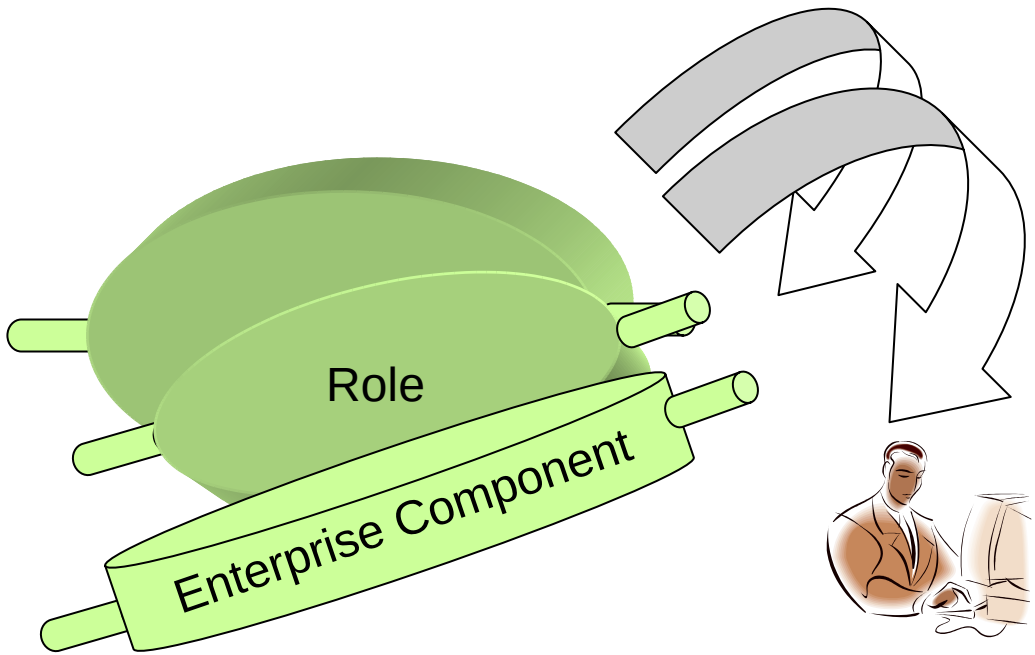
Getting value out of the Business Architecture

- Simulation of the business model
- Use the business model as the driver of the technology
- The service component layer implements and monitors many of the service interactions
- Model the I.T. components in the “same shape” as the business model
- Interacting components implement the enterprise workflow
- Model based acquisition
- Model based testing
- Generation of implementation components



Business (CIM) view -Collaborating Roles with Processes

“Upper” PIM (system) View - Enterprise Component



“Rotate” to look
At other aspects
of the component

People, organizations
And/or enterprise components
play roles in Business
Processes.

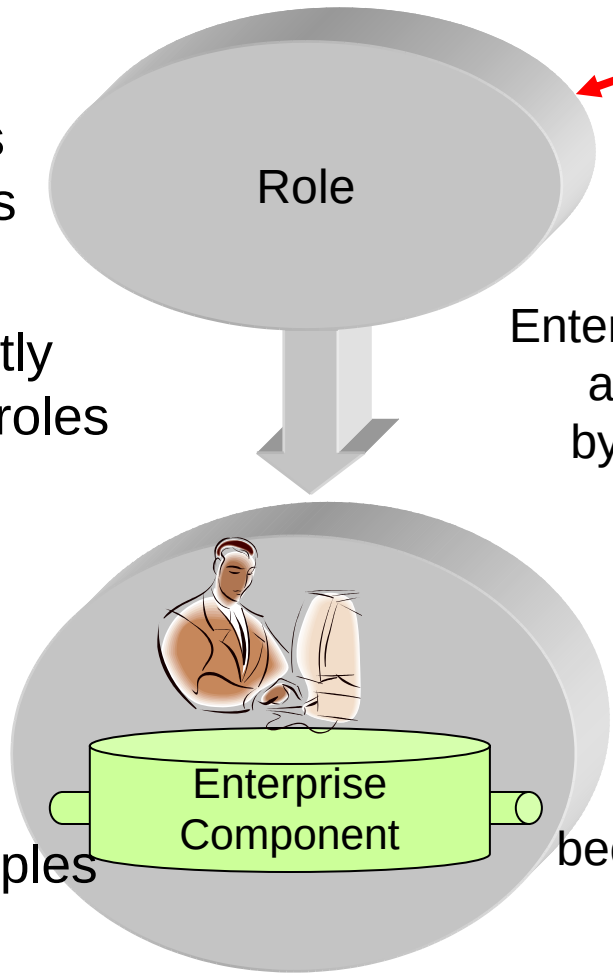
The “Enterprise Digital Assistant”

People, Organizations
And systems play roles

Components frequently
help people play these roles

People, organizations
and systems
components work
together to realize roles

Components are the peoples
Automated assistant

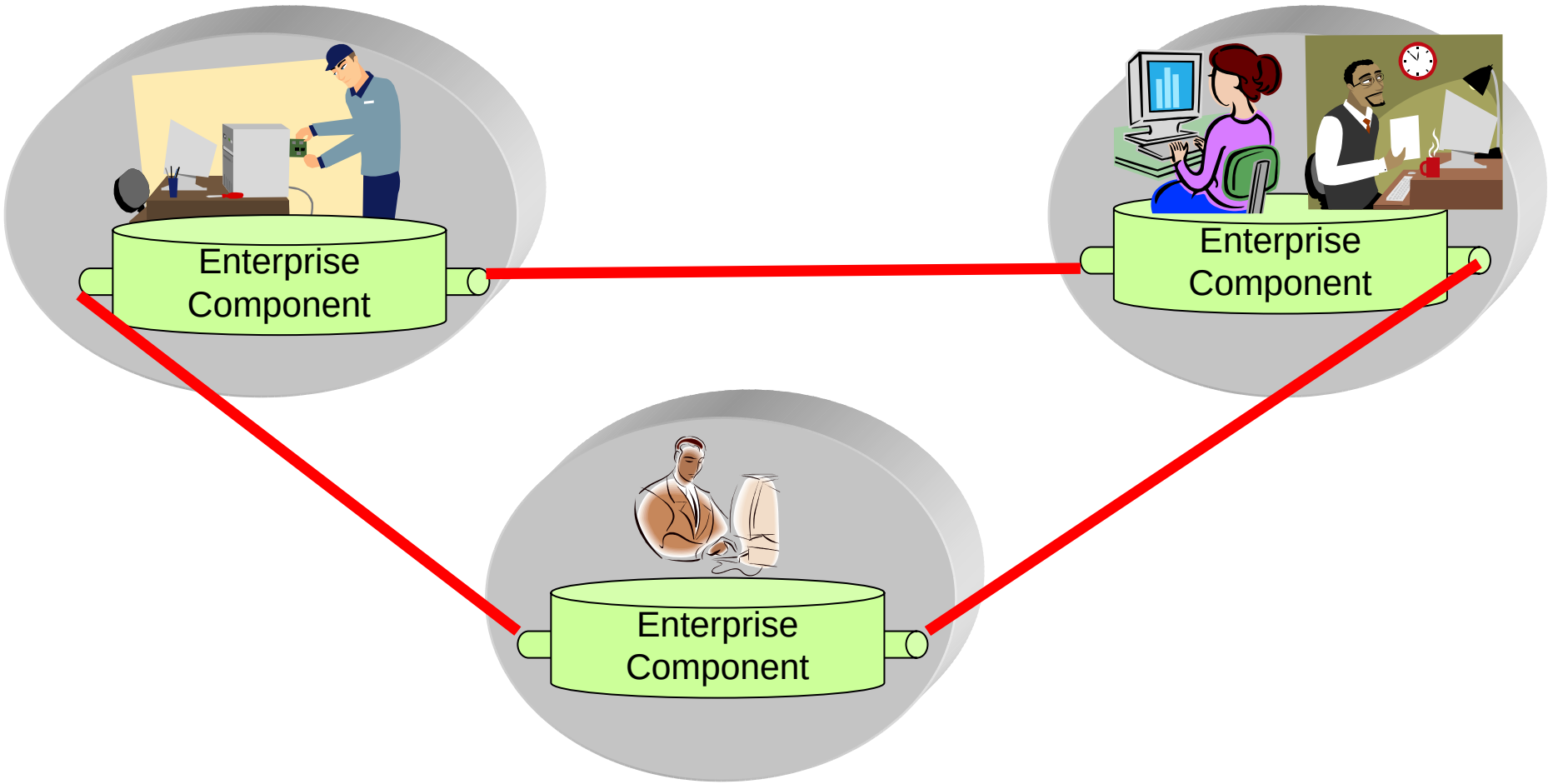


Business
Process

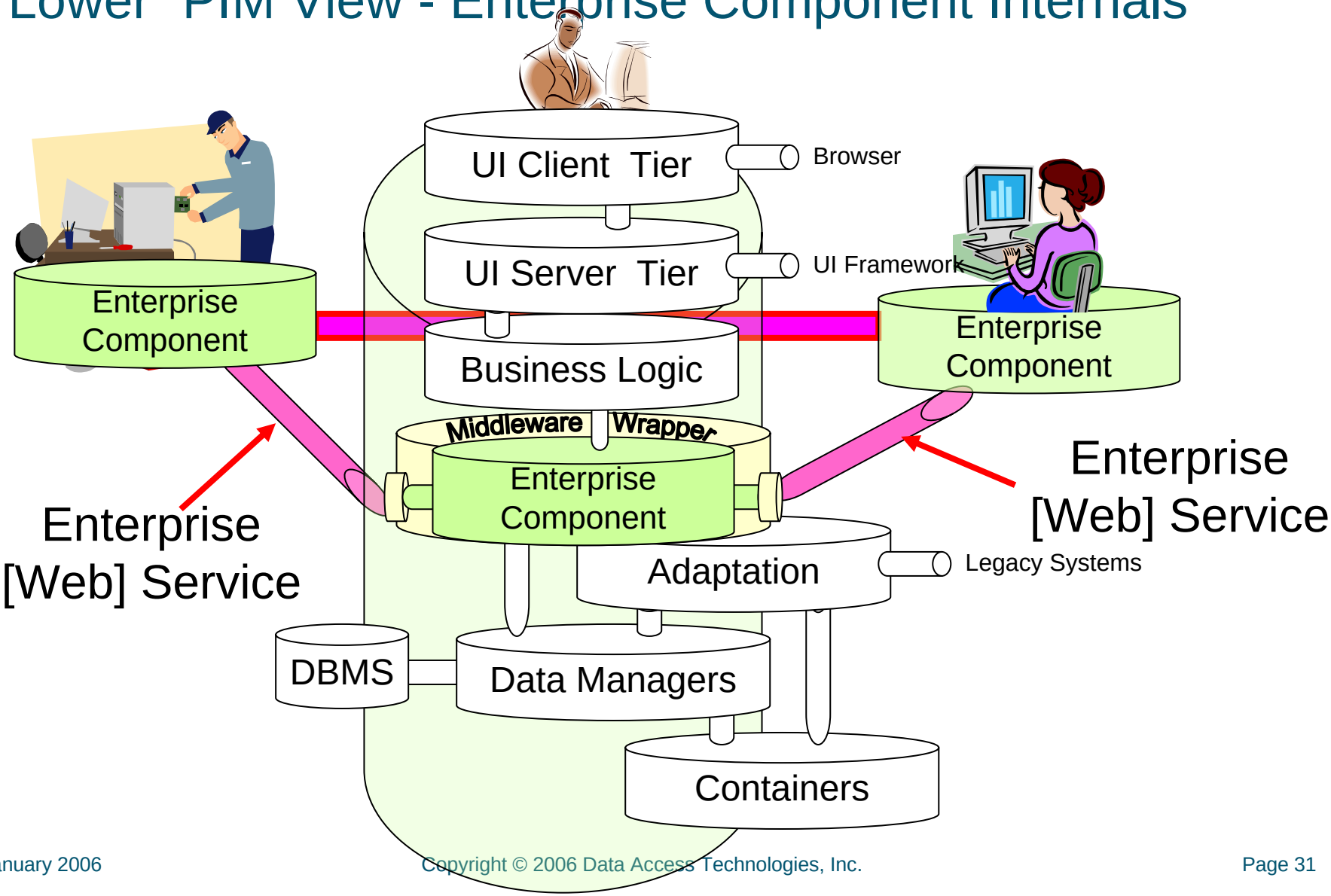
Enterprise components help people
and organizations play roles
by automating and monitoring
The business process

From the system perspective.
People and organizations
become part of the implementation
Of the role

People, Components & Organizations Collaborating



"Lower" PIM View - Enterprise Component Internals



MDA Generated Web Services Definition

```
<wsdl:portType name="CustomerOrderEstablishment.CustomerOrderEstablishment">
   <wsdl:operation name="CustomerOrderEstablishment">
     <wsdl:input message="tns:CustomerOrderEstablishmentPanopticInheritanceCluster“
                 name="CustomerOrderEstablishment">
     </wsdl:input>
   </wsdl:operation>
 </wsdl:portType>
```

The primary port type has operations corresponding to the request flows in the protocol.

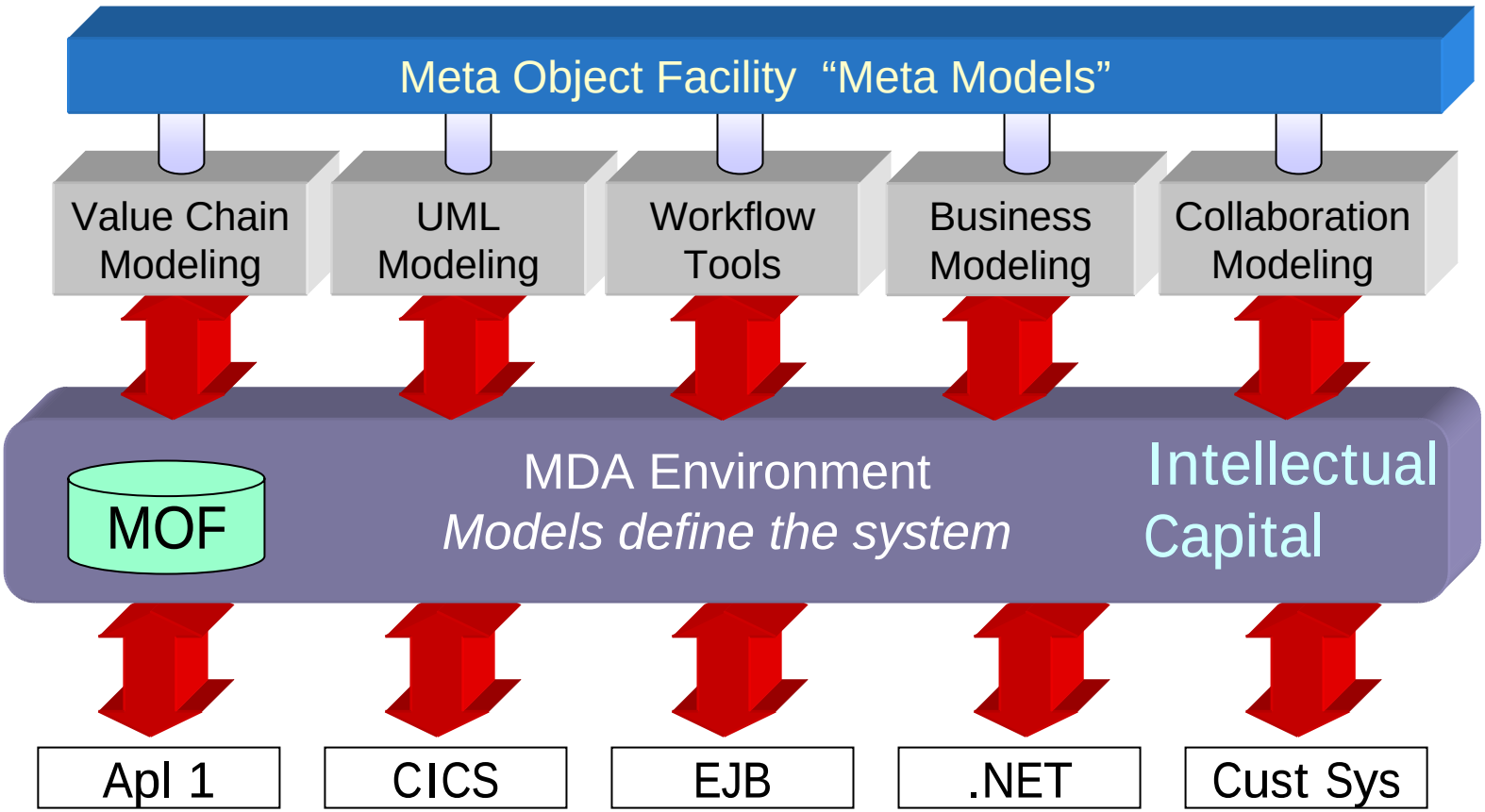
```
 <wsdl:portType name="CustomerOrderEstablishment.CustomerOrderEstablishmentCallback">
   <wsdl:operation name="CustomerOrderEstablished">
     <wsdl:input message="tns:CustomerOrderEstablishedPanopticInheritanceCluster“
                 name="CustomerOrderEstablished">
     </wsdl:input>
   </wsdl:operation>
   <wsdl:operation name="CustomerOrderEstablishmentRejected">
     <wsdl:input message="tns:CustomerOrderEstablishmentRejectedInheritance“
                 name="CustomerOrderEstablishmentRejected">
     </wsdl:input>
   </wsdl:operation>
 </wsdl:portType>
```

The callback port type has operations corresponding to the response flows in the protocol.

Example Transaction Message XML Document

```
<CustomerOrderEstablishment>
     <customerOrderEstablishment>
          <newOrder>
               <customerOrder>
                    <customerOrderID> … </customerOrderID>
                    <customerOrderAmount> … </customerOrderAmount>
                    <orderingCustomer>
                         <customer>
                              <customerID> … </customerID>
                         </customer>
                         <party>
                              <name> … </name>
                         </party>
                    </orderingCustomer>
                    <controllingSalesInstrument>
                         <salesInstrumentID> … </salesInstrumentID>
                    </controllingSalesInstrument>
                    …
                    <lineItems>
                         …
                    </lineItems>
               </customerOrder>
          </newOrder>
     </customerOrderEstablishment>
     <businessDomainTransaction>
          <transactionID> … </transactionID>
     </businessDomainTransaction>
</CustomerOrderEstablishment>
```

Common Environment for Intellectual Capital



Integration of infrastructure

Business SOA Benefits

- Agile way to understand and plan the enterprise
- Oriented around business concepts of roles, responsibilities and services
- Allows business units the flexibility to define their own business processes (the way they will deliver a service) while supporting common business processes
- Allows business units the flexibility to buy or build their own supporting technology while supporting common components and shared services
- The business model drives the technology
- Smooth transition strategy, in terms of the business and the supporting technology
- Automation provides interoperable solutions quickly and with less cost