Creating A Single Global Electronic Market

UN/CEFACT OASIS

ebXML Collaboration Protocol Profile and Agreement specification, ver. 1.0
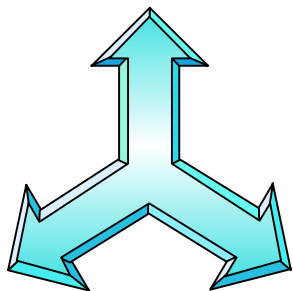
Martin Sachs

ebXML TP Team Lead

IBM T. J. Watson Research Center, Yorktown Hts, NY

mwsachs@us.ibm.com
July 24, 2001

Outline of Presentation

Introduction to ebXML CPP-CPA specification, ver. 1.0 for new members of CPPA team

- Problems of business to business business
- Electronic trading-partner agreements
- ebXML standardization of electronic TPA
- Details of profiles and agreements
- B2B middleware and tools

Challenges to Business Integration

- Companies have not been able to tightly integrate their Web commerce application to their back-end systems.
  - Dozens of complex ERP and business application systems
  - 90% of the Fortune 1000 run on at least three different operating systems, further complicating business integration.
- And few e-commerce Web sites are integrated with existing business systems today.
  - Our own research indicates that as little as 2% of all e-commerce sites integrate with their back end systems.
- Business integration is complex, time-consuming.
  - "70% of the cost of writing an application is writing the infrastructure"   -- Gartner

Solution

Streamline the process of setting up and doing business between businesses.

- Party profile of IT parameters (XML document)
  - Collaboration Protocol Profile

- Agreement document (XML) composed from two parties' profiles
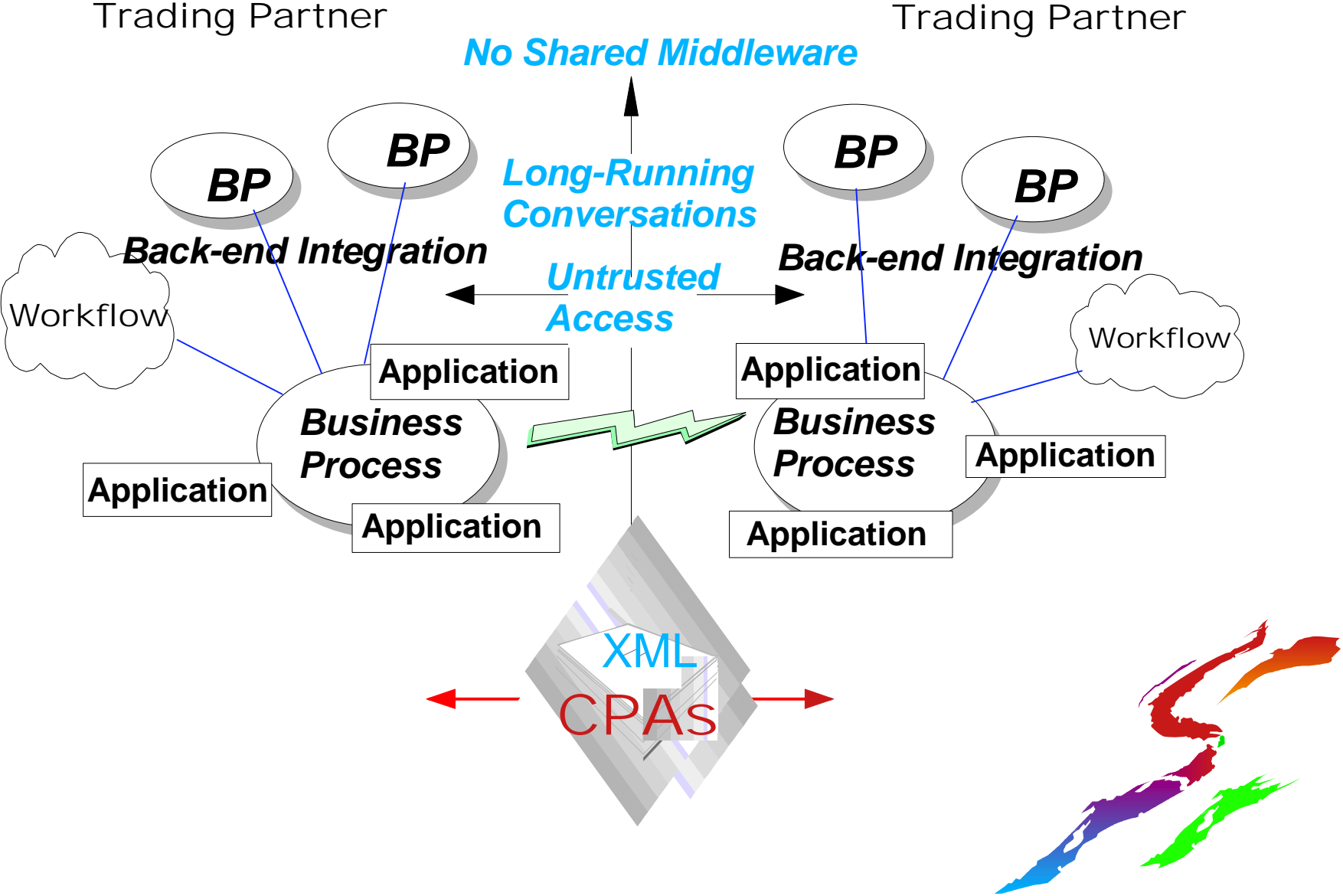 - Collaboration Protocol Agreement
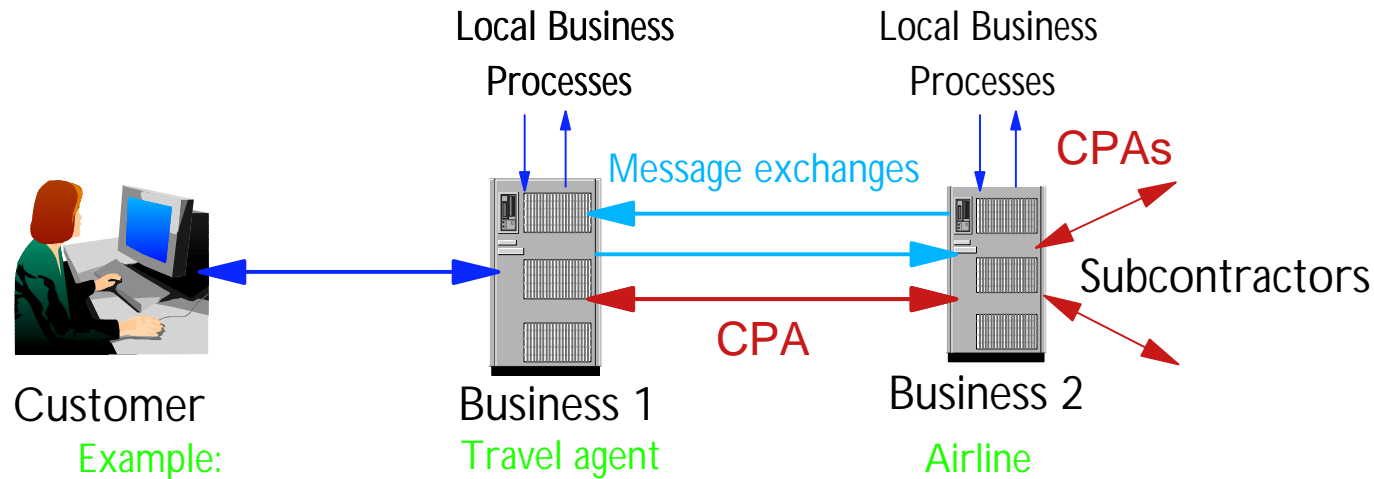
Cross-enterprise Application Integration

- ***Heterogeneous applications and platforms***
  - Partners not required to use same middleware
- ***Loose coupling of business platforms***
  - Each party's internal processes independent of other's
  - No party can lock resources at other parties
  - Explicit recourse actions instead of rollback
    - Cancel the reservation
  - Logs provide needed correlations among parties
- ***Untrusted application components***
  - Controlled & monitored
  - Check that prescribe sequence of actions is followed

ebxml-cpp-cpa.prz

Inter-enterprise Integration

Trading Partner

Trading Partner

No Shared Middleware

BP

BP

BP

BP

Long-Running Conversations

Back-end Integration

Back-end Integration

Untrusted Access

Workflow

Workflow

Application

Application

Business Process

Business Process

Application

Application

Application

Application

XML

CPAs

Electronic CPA

Local Business Processes   Local Business Processes

CPAs

Message exchanges

Subcontractors

CPA

Customer   Business 1   Business 2

Example: Travel agent   Airline

- Rules of interaction between independent businesses
  - Not a complete definition of the application
- Independent of the internal business processes at each party
- XML document
  - Authoring tool (understands CPA semantics)
- Automatic generation of customization code at each party
  - Formal specification of CPA avoids misinterpretation
  - Assures that parties configured compatibly

Using the CPA to do Business

- Parties publish information about their business and their CPAs

- Parties agree to interact

- Parties compose a CPA from their CPPs

- Procure or write application code

- Register (install) information from CPA
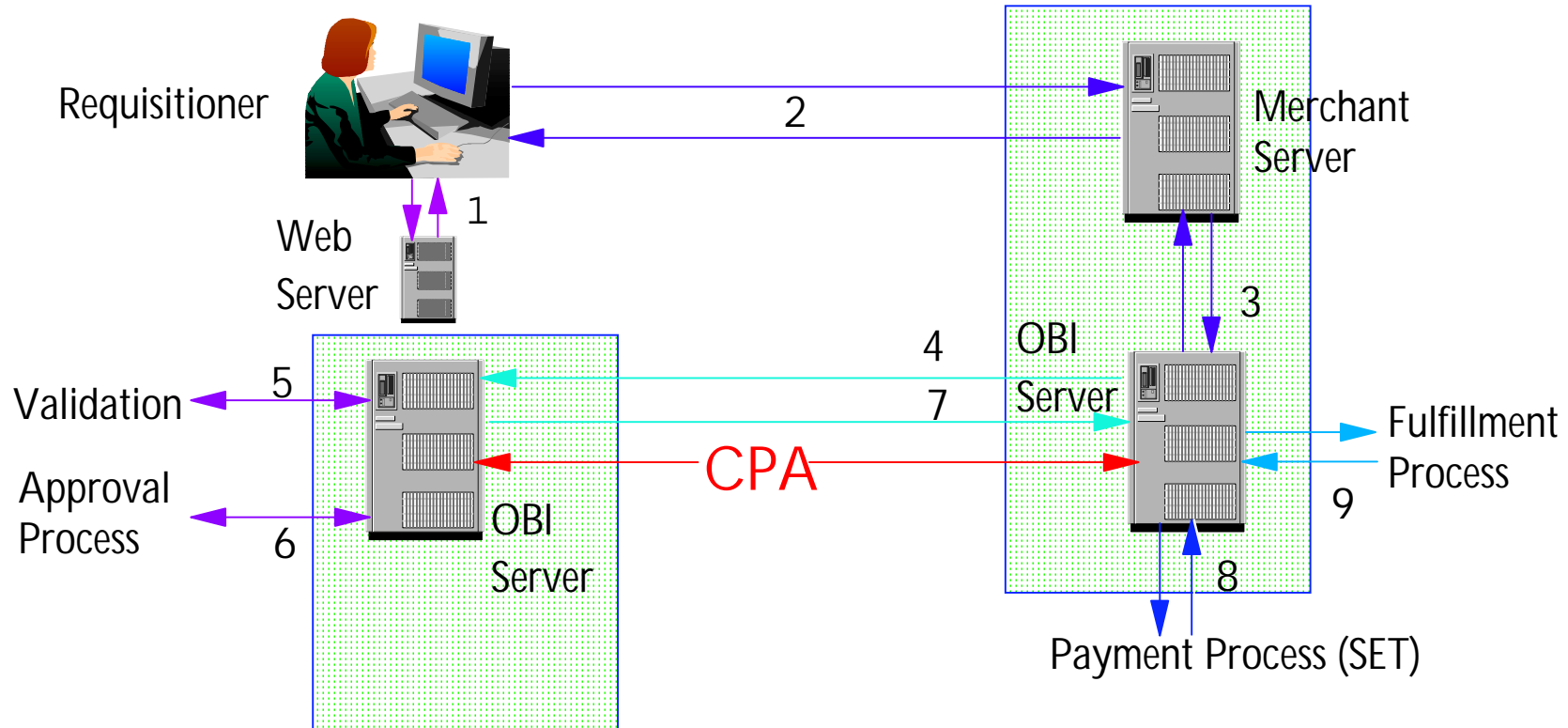
- Do business under the CPA

Long-Running Conversation

- CPA defines a single conversation
  - Unit of business under a CPA
  - Instantiate many conversations, serial or concurrent

- Sequence of related business transactions

- Asynchronous or synchronous messages

- Each party maintains history and enforces CPA

- Each party maintains correlations across conversations

- Each party invokes own internal business logic

OBI: Open Buying on the Internet

Buyer organization

Seller organization

Requisitioner

Web
Server

1

2

Merchant
Server

3

Validation

5

4

OBI
Server

7

OBI
Server

Approval
Process

6

CPA

Fulfillment
Process

9

8

Payment Process (SET)

Standardizing Profiles and Agreements

- Interoperability is essential to wide-spread B2B e-commerce
  - Avoid vendor-dependent solutions
  - Partners with different implementations must be able to do business

- Create a vendor-neutral standard CPP and CPA language

- ebXML TP team produced a specification for electronic CPPs and CPAs based on IBM contribution (tpaML proposal)
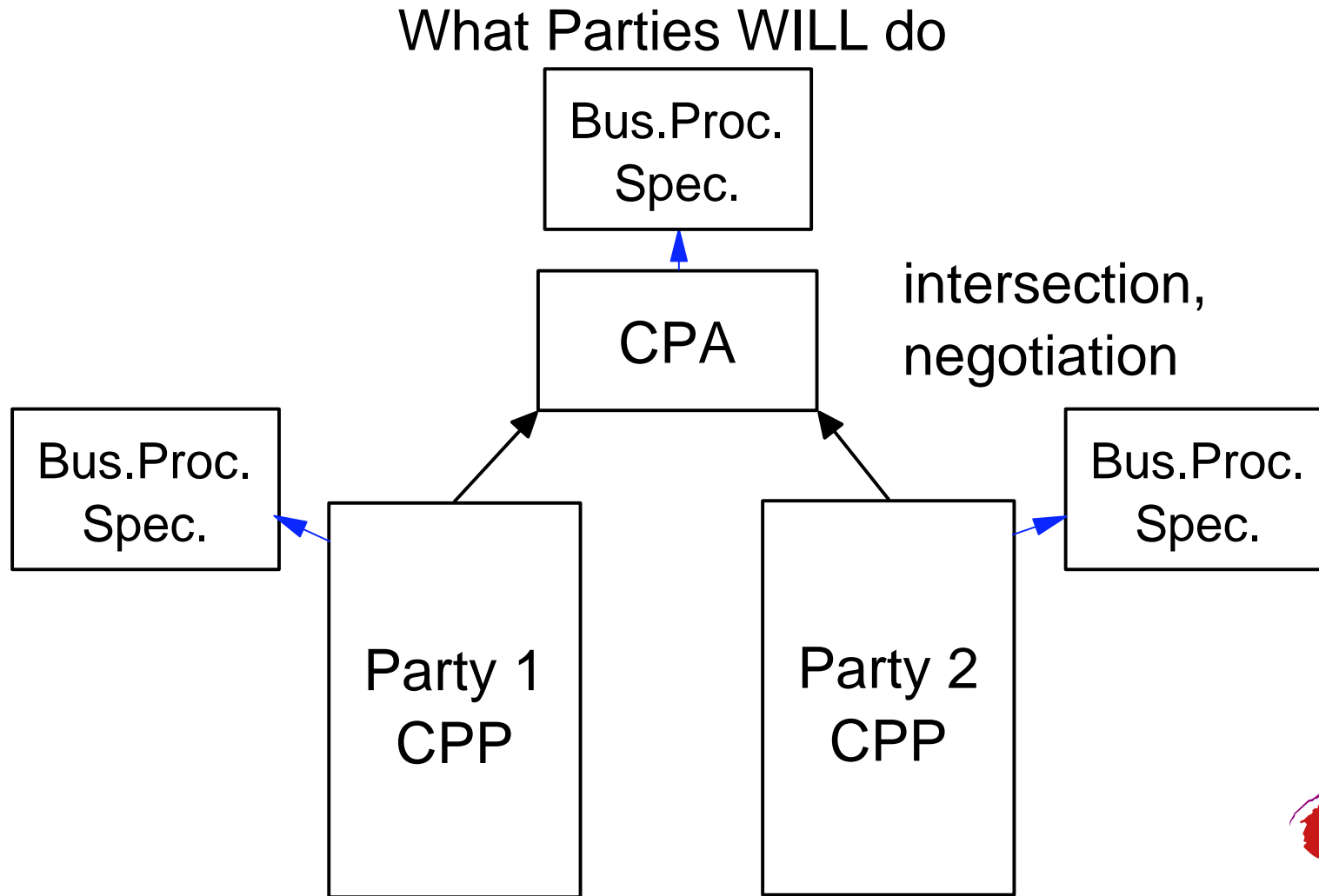
Trading-Partners Team

- Trading-Partners Team (M. Sachs, lead)
  - Defined a specification for creating the IT parts of a partner profile and agreement
  - Goal: enable automated configuration from CPA
  - Status: Version 1.0 approved 5/11/01
  - Work to be continued by OASIS CPPA team

ebXML Profiles and Agreements

- Collaboration Protocol Profile (CPP)
  - Describes party's IT capabilities
    - Communication protocols
    - Security requirements
    - Business processes it supports
- Collaboration Protocol Agreement (CPA)
  - Agreed IT capabilities
  - Business process to be performed
    - Definition of business transactions, transition rules, etc.
- CPA is intersection of two parties' CPPs plus results of negotiating variable parameters

Composing a CPA

What Parties WILL do

```
        Bus.Proc.
          Spec.
            ↑
          CPA          intersection,
                       negotiation
  Bus.Proc.                        Bus.Proc.
    Spec.                            Spec.
      ↖                              ↗
        Party 1          Party 2
          CPP              CPP
```

What Parties CAN do

Key CPA Information

	Examples
Overall properties	**Agreement duration**
Identification	**Business partner info.**
Communication properties	**HTTP**
Document-exchange properties	**Message protocol**
Security properties	**Authentication, non-repudiation**
Roles	**Buyer, seller, broker**
Business transactions	**Reserve, modify**
Requests	**Request Reservation**
Responses	**Confirm Reservation**
Transition rules	**Modify after confirm**
Comments	**ID of accompanying paper contract**
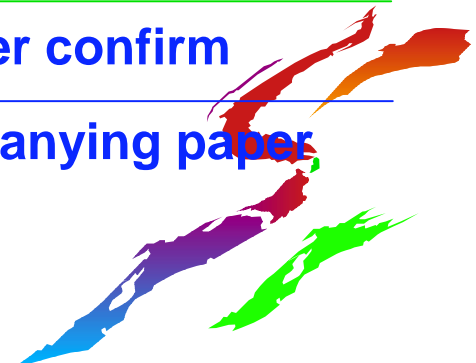
Main Functions of CPP and CPA

- Party identification

- Transport
  - Protocol, addresses, security

- Document exchange
  - Messaging protocol, security, etc.

- Process Specification (external document)
  - Business transaction definitions
  - Derived from business process metamodel
    - ebXML BPSS Specification

CPP Structure

```
<CollaborationProtocolProfile
  various namespace attributes...>
  <PartyInfo>
      ...
  </PartyInfo>
  <Packaging
      <!--MIME and security specifications-->
  </Packaging>
  <ds:Signature>
    <!--based on XML Digital Signature--></ds:Signature>
  <Comment>any text</Comment>
</CollaborationProtocolProfile>
```

Party Information

```
<PartyInfo>
  <PartyId type="uriReference">duns:...</PartyID>
  <PartyRef xlink.../> <!--link to additional information-->
  <CollaborationRole>
    <!--process specification and roles-->
  </CollaborationRole>
  <Certificate certId = "N03"> <!-- ref. to certificate definition-->
    <ds:KeyInfo>XMLDSIG></ds:KeyInfo>
    <!--certificate information in line or remote-->
  </Certificate>
  <DeliveryChannel>  ... </DeliveryChannel>
  <Transport>  ... </Transport>
  <DocExchange>  ... </DocExchange>
</PartyInfo>
```

Roles

- Process specification defined in terms of roles
  - Buyer, seller, etc.

- CPP indicates which roles party can play

- CPA binds specific parties to roles

CollaborationRole element

- Reference to certificate definition
- Pointer to Process-Specification document
- Role in process specification
- ServiceBinding
  - Reference to a delivery channel for this role in the identified process specification
  - Overrides
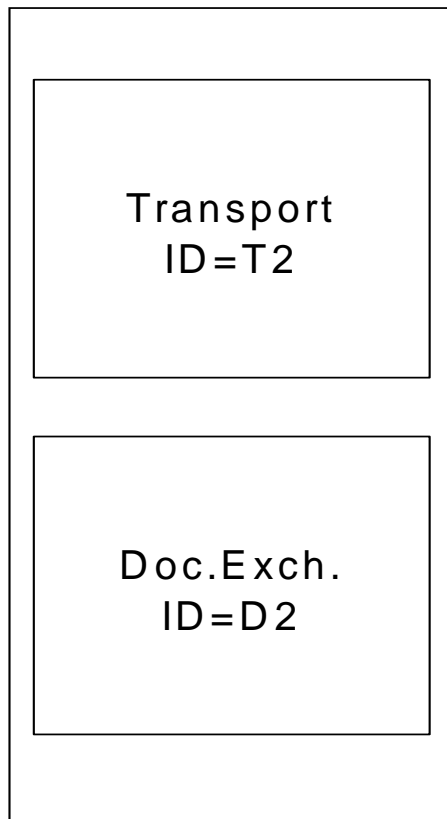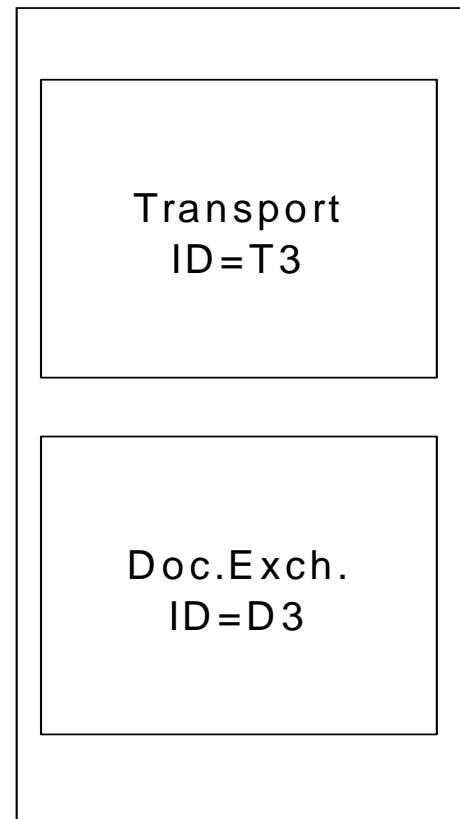   - Alternative delivery channels for specific messages

Delivery Channels

Delivery
Channel
ID=DC1
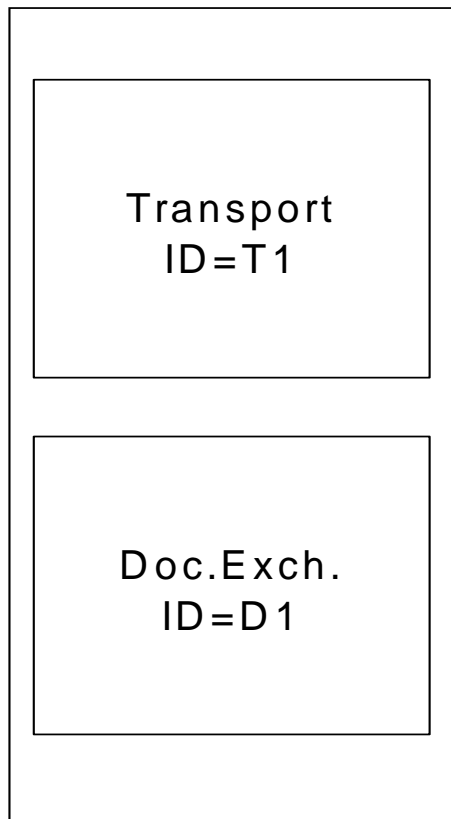
Delivery
Channel
ID=DC2

Delivery
Channel
ID=DC3

Transport
ID=T1

Transport
ID=T2

Transport
ID=T3

Doc.Exch.
ID=D1

Doc.Exch.
ID=D2

Doc.Exch.
ID=D3

Delivery Channel

- Defines receive properties of party

- Combination of
  - One transport definition
  - One doc exchange definition

- Multiple delivery channels in CPA
  - Dynamically selected for each message
  - Statically bound to individual business transactions or individual message definitions

Delivery Channel Definition

```
<DeliveryChannel channelId = "N04" transportId = "N05"
  docExchangeId = "N06">
  <Characteristics
    syncReplyMode="responseOnly'
    nonrepudiationOfOrigin = "true"
    nonrepudiationOfReceipt = "true"
    secureTransport = "true"
    confidentiality = "true"
    authenticated = "true"
    authorized = "true"/>
</DeliveryChannel>
```

Key Transport Elements

- Transport
  - Protocol
    - HTTP, SMTP, FTP
  - Addresses
- Transport Security
  - Protocol (e.g. SSL 3.0)
  - Certificates for authentication by transport protocol

Key Document-Exchange Elements

- Message exchange protocol
  - ebXML messaging, XML Protocol, etc.
- Reliable Messaging parameters
  - Semantics (e.g. OnceAndOnlyOnce)
  - idempotency, timeouts, retries
- Security
  - Nonrepudiation
    - certificates, protocol, hash function, signature algorithm
  - Digital envelope
    - certificates, encryption algorithm

Process Specification

- Set of business transactions to be performed.
- Defined by ebXML Business Process Specification Schema
  - Separate XML Process Specification document
- ProcessSpecification element in CPP/CPA
  - Name of process
  - Pointer to Process Specification Document
  - Elements for generating digest of Process Specification Document
    - Verify that it has not been altered since CPP created
    - Based on XML Digital Signature technology

Business Transactions Examples

Business transactions in a CPA are defined by the business process, not mandated by the CPA standard.

- In a procurement CPA
  - Process purchase order
  - Modify purchase order
  - Cancel purchase order

- In an airline reservation CPA
  - Reservation request
  - Modify reservation
  - Cancel reservation
  - Confirm reservation

Process Specification Document

- Business Transaction Definitions
  - Request name
  - Request message (schema)
  - Reply name and schema
  - Maximum allowed service time
- Transition rules
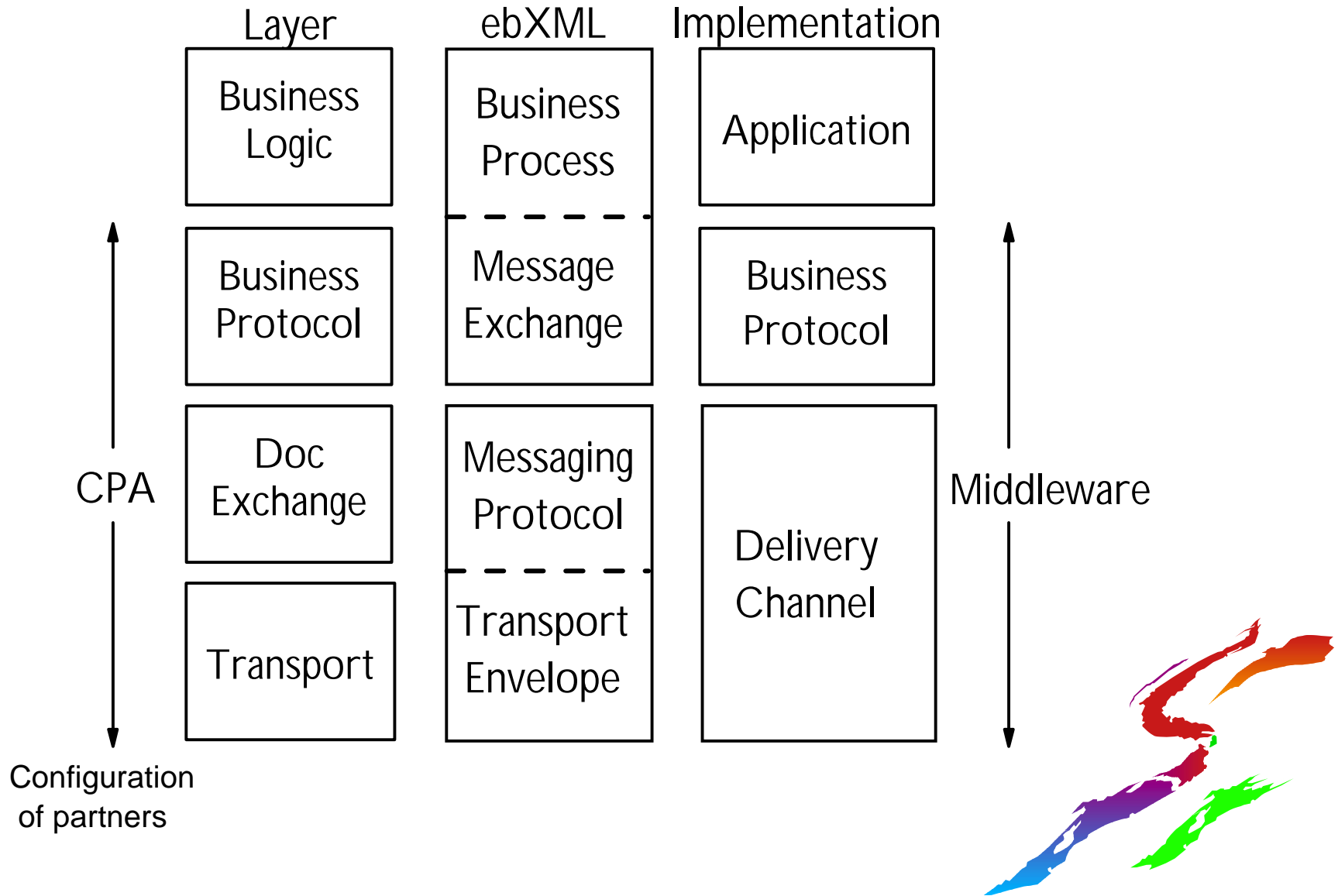 - E.G. order of execution of business transactions

Middleware needed to make it work

- CPA Registration

- Message Routing (ebXML Message Service)

- Transition Rules checking

- Business document generation and parsing

- Security

- Correlation of conversations

- Logging

- Recovery

Functional Layer Comparison

Layer	ebXML	Implementation
Business Logic	Business Process	Application
Business Protocol	Message Exchange	Business Protocol
Doc Exchange	Messaging Protocol	Delivery Channel
Transport	Transport Envelope	

CPA

Middleware

Configuration
of partners

ebxml-cpp-cpa.prz

Supporting Tools

Value-added tools, not part of formal standard

- CPA composition and negotiation tool
- Authoring tool
  - Understands CPP semantics
- Code customizer/generator
  - Converts CPA to code at each party's system
  - Parameters of party identification, communications, security, and business protocol
- Application can be up and running within minutes of finalizing CPA.

Partner Profiles

- Profiles can be placed in public repositories
  - ebXML Repository
  - Discovery of prospective business partners
- Business description
  - Products or services
  - Prices, volumes, shipping times, etc.
  - What is negotiable
- CPP information
  - Supported business processes, communication protocols, etc.

Automation of CPA Life Cycle

Discovery/Negotiation based on partner profiles

- Partner profile
- Services advertisement and discovery
  - Repository of partner profiles, query capability
  - Discovery and negotiation services
- Negotiation of business parameters
- Negotiation of CPA details between partners
- Build CPA from profiles and negotiation results
- Register negotiated CPA at partner sites
- Do business

Summary

- Partner profile (CPP)

- Executable agreement (CPA)

- Can support new processes, existing standards (e.g. OBI, RosettaNet),

- CPP and CPA functions
  - Business transaction definitions
    - External document
  - Document exchange definitions
  - Transport definitions

- CPA composed from two parties' CPPs
  - Negotiation process possible