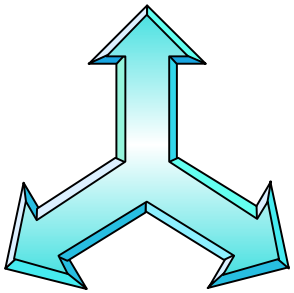
ebXML

UN/CEFACT

OASIS

Creating A Single Global Electronic Market

Business to Business Integration with Electronic Trading-Partner Agreements



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Outline of Presentation

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

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.

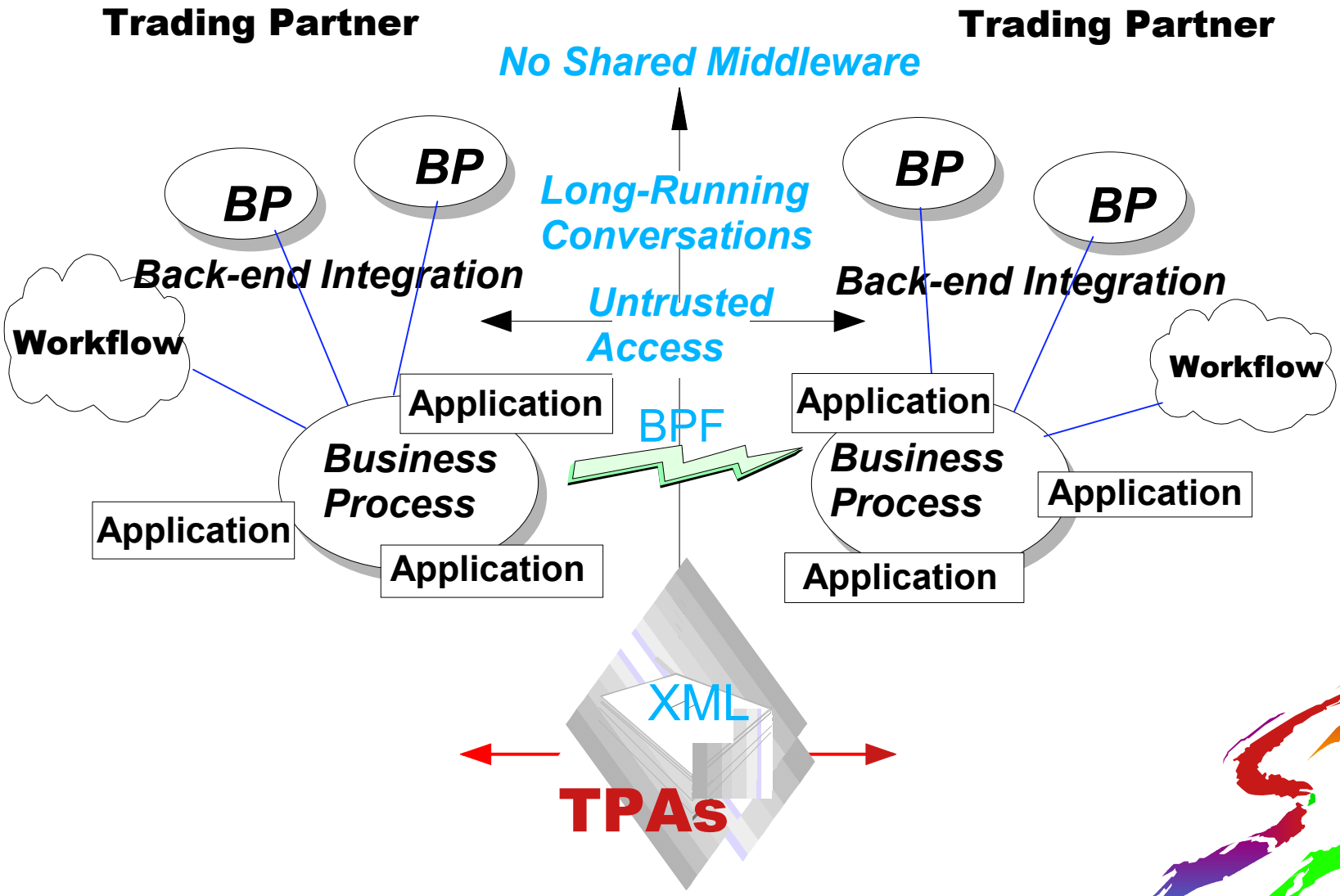
IBM Research proof-of-concept prototype:

- Electronic Trading Partner Agreement (TPA)
  - "Trading Partner Markup Language" (tpaML)
- Business to Business Protocol Framework (BPF)
  - Run-time support for TPA

Cross-enterprise Application Integration

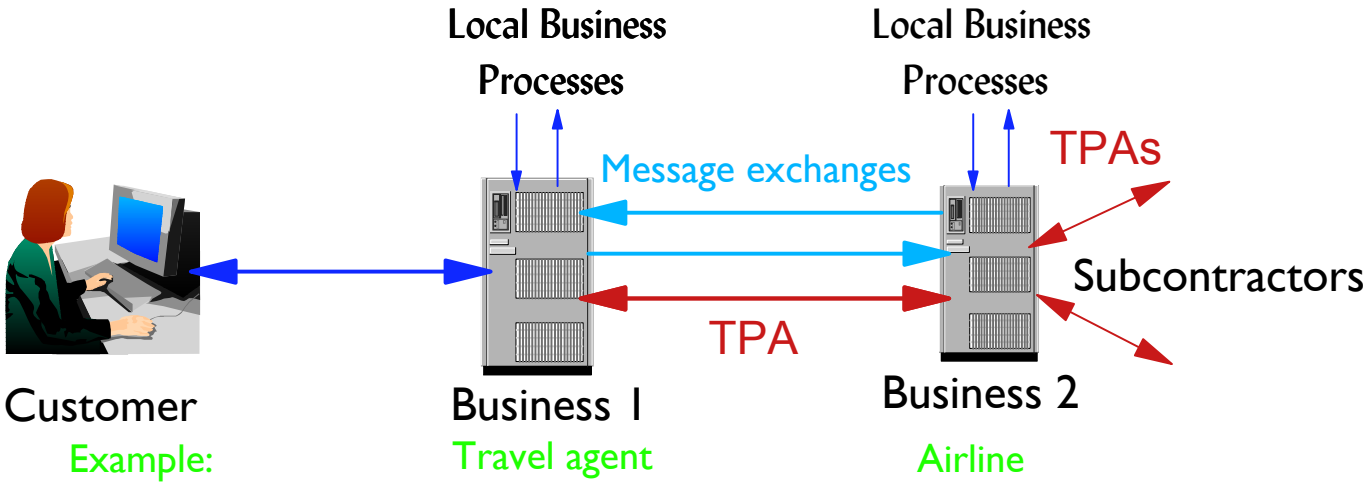
- ***Heterogeneous applications and platforms***
  - Partners not required to use same middleware
- ***Loose coupling of business platforms***
  - Each party's internal processes independent of other's
  - No party can lock resources at other parties
  - Explicit recourse actions instead of rollback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

Inter-enterprise Integration



BPF: Business-to-business Protocol Framework

Electronic TPA



- 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 TPA semantics)
- Automatic generation of customization code at each party
  - Formal specification of TPA avoids misinterpretation
  - Assures that parties configured compatibly

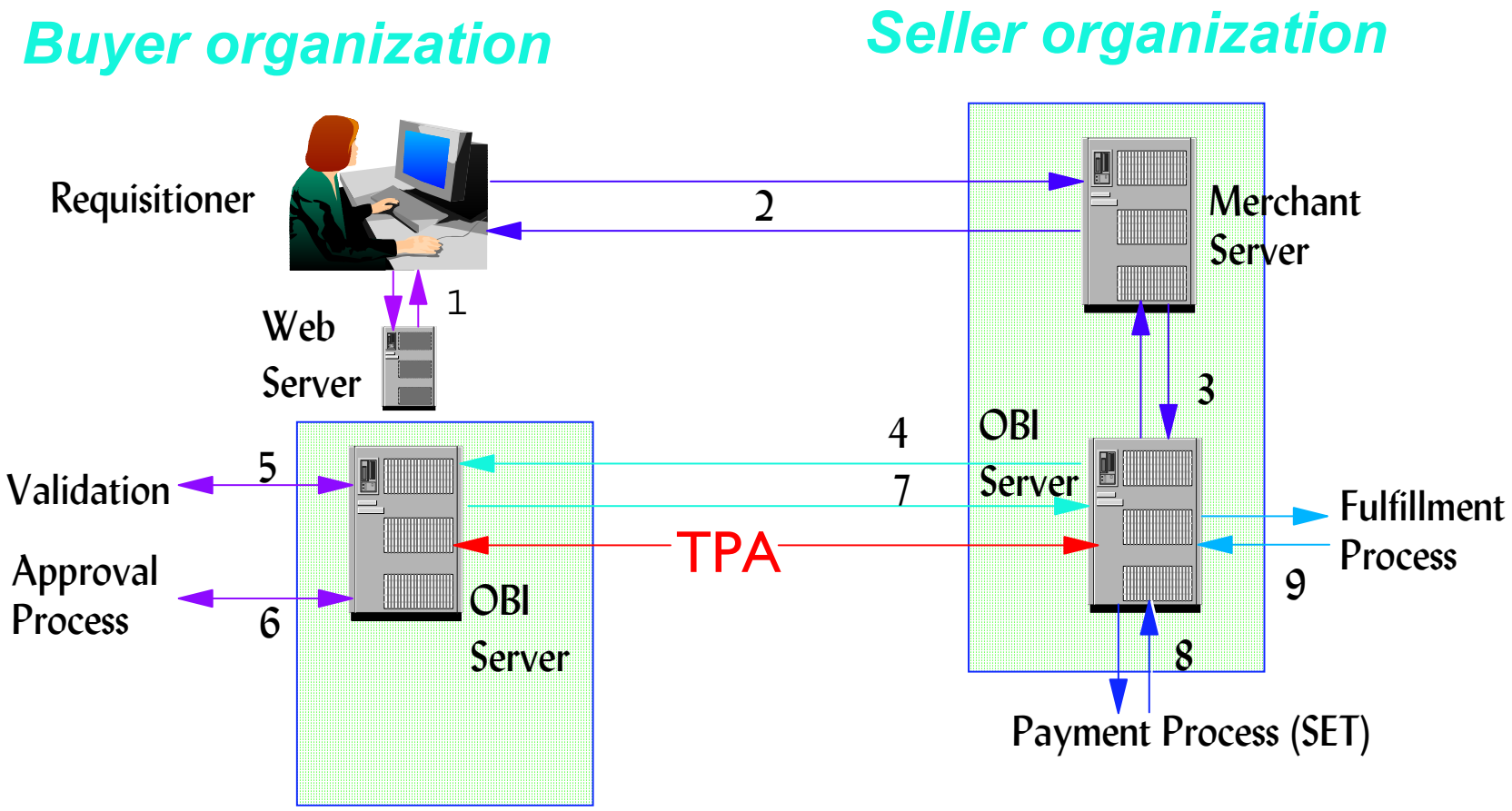
Using the Electronic TPA to do Business

- Parties agree on how to interact
- Write application code
- Write a TPA that expresses the agreement
- Generate TPA code at each partner's site
- Register (install) information from TPA
- Do business under the TPA

Long-Running Conversation

- TPA defines a single conversation
  - Unit of business under a TPA
  - Instantiate many conversations, serial or concurrent
- Sequence of related business transactions
- Asynchronous or synchronous messages
- Each party maintains history and enforces TPA
- Each party maintains correlations across conversations
- Each party invokes own internal business logic

OBI: Open Buying on the Internet



Standardizing the TPA

- 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 TPA language
- ebXML has begun a standardization activity on electronic TPAs based on the IBM tpaML proposal

ebXML

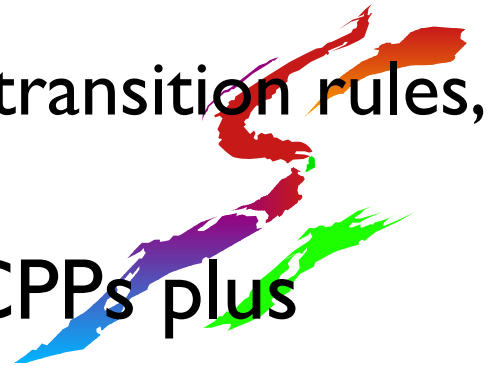
- Broad-based industry consortium for electronic commerce standards (approx. 120 companies)
- Open XML-based infrastructure for global e-business information
  - Lower e-business entry barrier for small/medium enterprises and developing nations
- Project teams related to electronic TPA
  - Business process methodology
  - Message structure and routing
  - Trading partner profiles and TPA
  - Registry and repository

ebXML Trading-Partner Project Team

- Mission
  - Define a specification for creating the IT part of a partner profile and a TPA.
  - Enable automated configuration generation from TPA.
- TPA
  - IT configuration file, specifies only things that middleware can manage and enforce.
  - No business information.
  - No business semantics except message names/schemas and transition rules.
    - Derive from BP metamodel

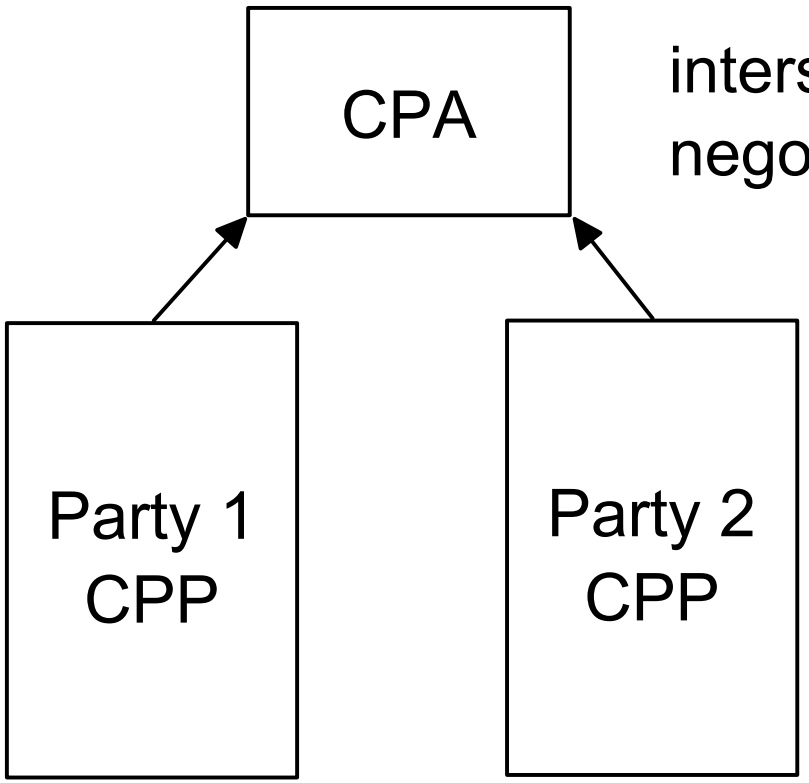
ebXML Profiles and Agreements

- 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

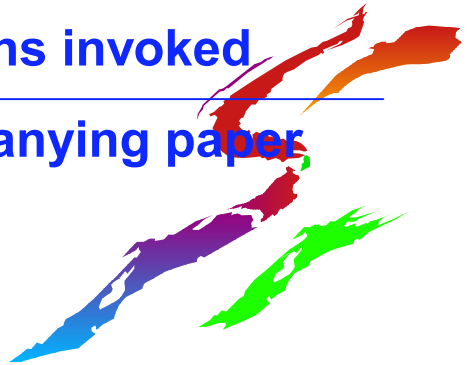


intersection,
negotiation

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
Responsiveness	Timeout
Transition rules	Modify after reserve
Error handling	Retries, actions invoked
Comments	ID of accompanying paper contract



Main sections of CPP and CPA

- Party identification
- Transport
  - Protocol, encoding, timeout, security, etc.
- Document exchange
  - Messaging protocol, security, etc.
- Collaboration protcol
  - Business transaction definitions
  - Derived from business process metamodel

CPP Structure

```
<CollaborationProtocolProfile id = "id"
  various namespace attributes...>
  <Party partyId = "N01">
      ...
  </Party>
  <!--CollaborationProtocol:  one or more-->
  <CollaborationProtocol version = "1.0" id = "N07"
    xlink:type = "locator"
    xlink:href = "http://www.ebxml.org/services/purchasing.xml">
     Buy and Sell
  </CollaborationProtocol>
  <ds:Signature>any combination of text and elements
  </ds:Signature>
</CollaborationProtocolProfile>
```

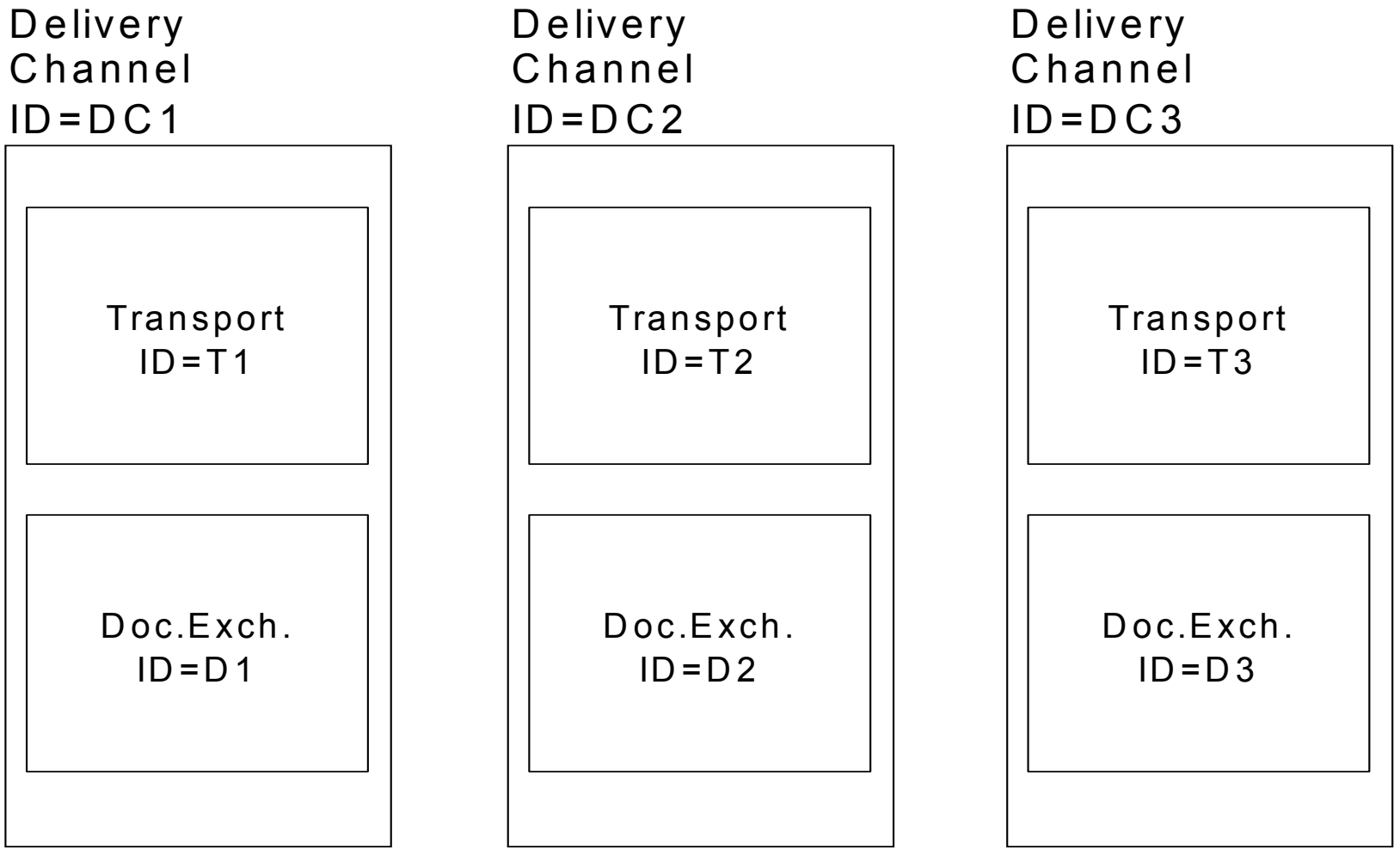
Party Information in CPP

```
<Party partyId = "N01">
  <PartyId type="uriReference">duns:...</PartyID>
  <PartyDetails xlink.../> <!--link to additional information-->
  <Role certId="N03" roleId="N02" name'"buyer">
    <ServiceBinding xlink:type = ...>
    <!--link to collaboration protocol-->
    </ServiceBinding> N/Role>
  <Certificate certId = "N03"> <!-- ref. to certificate definition-->
    <ds:KeyInfo>XMLDSIG></ds:KeyInfo>
    <!--certificate information in line or remote-->
  </Certificate>
  <DeliveryChannel>  ... </DeliveryChannel>
  <Transport>  ... </Transport> <!--Transport-->
  <DocExchange>  ... </DocExchange>
</Party>
```

Roles

- Collaboration protocol defined in terms of roles
  - Buyer, seller, etc.
- CPP indicates which roles party can play
- CPA binds specific parties to roles

Delivery Channels



Delivery Channel Contents

- 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
    nonrepudiationOfOrigin = "true"
    nonrepudiationOfReceipt = "true"
    secureTransport = "true"
    confidentiality = "true"
    authenticated = "true"
    authorized = "true"/>
  <ServiceBinding xlink:type = "locator"
    xlink:href ="http://www.example.com/services/purchasing"/>
</DeliveryChannel>
```

Key Transport Elements

- Communication
  - Protocol
    - HTTP, SMTP, FTP
  - Addresses
  - Timeout information
- Transport Security
  - Encryption definition
  - Authentication definition
  - Certificates
    - Each party's certificate (1 or more) information

Key Document-Exchange Elements

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

Collaboration Protocol

- Set of business transactions to be performed.
- Defined by ebXML Business Process Metamodel
  - Separate XML document

```
<CollaborationProtocol version = "1.0" id = "N07"
  xlink:type = "locator"
  xlink:href = "http://www.ebxml.org/services/purchasing.xml">
  Buy and Sell
</CollaborationProtocol>
```

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

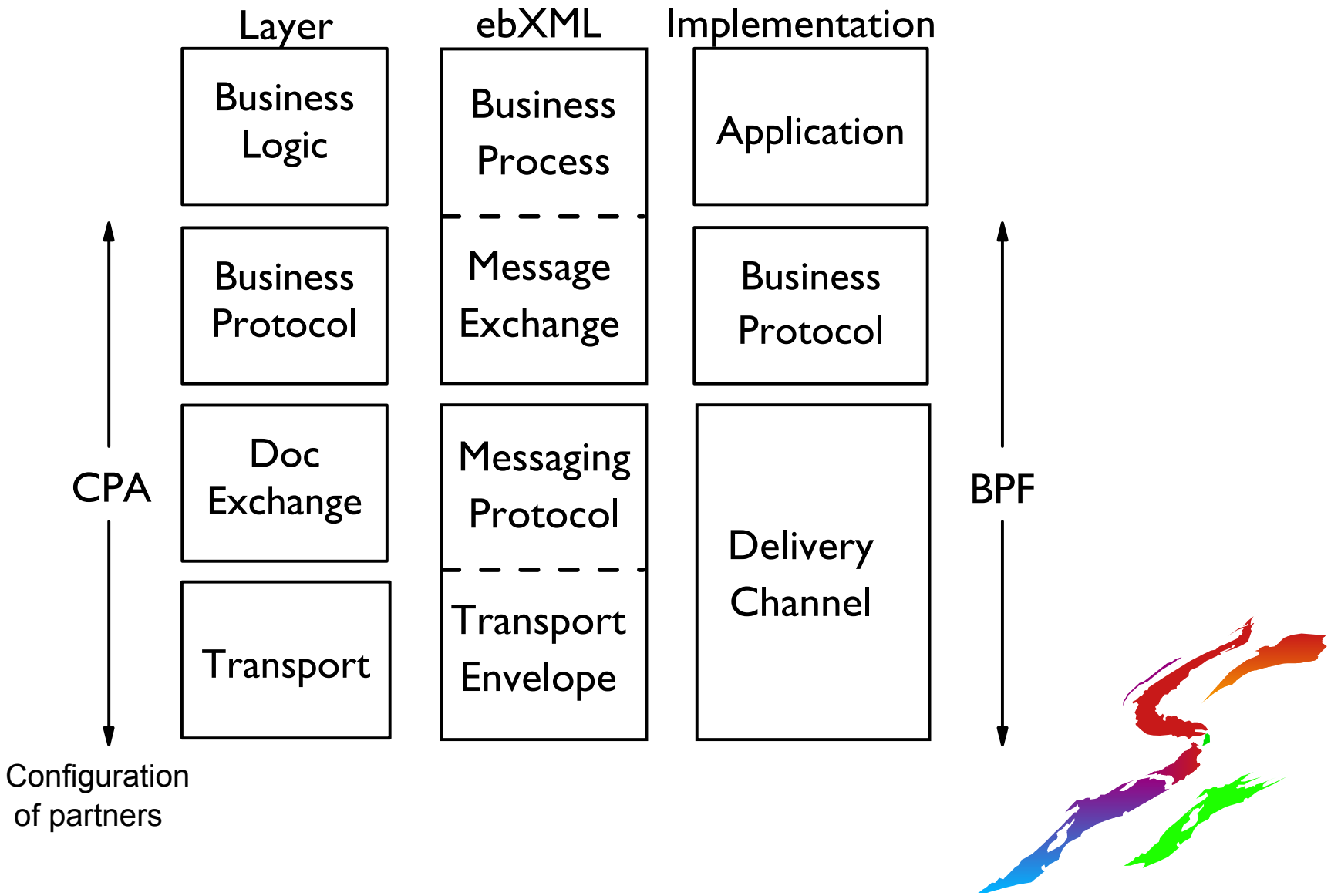
Elements of Business Transaction Definition

- Request name
- Request message (schema)
- Delivery channel
- Reply name and schema
- Exception reply name and schema
- Maximum allowed service time
- Transition rules

Some BPF Services

- TPA Registration
- Message Routing
- Transition Rules checking
- Business document generation and parsing
- Security
- Correlation of conversations
- Logging
- Recovery

Functional Layer Comparison



Supporting Tools

Value-added tools, not part of formal standard
(IBM Research proof of concept)

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

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

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.

Negotiation Process

- CPA negotiation is a business process
- Controlled by a negotiation CPA
  - Between partners
  - Between each partner and negotiation service
- Initial inputs are CPPs of two prospective partners
- Offer, counter-offer information in business messages exchanged by business transactions
- Successful result is a CPA

Future: spontaneous e-commerce

Summary

- Partner profile (CPP)
- Executable agreement (CPA)
- Can support existing standards (e.g. OBI), new processes
- CPP and CPA functions
  - B to B protocol (business transaction definitions)
  - Document exchange definitions
  - Communication definitions
- CPA composed from two parties' CPPs
  - Negotiation process possible