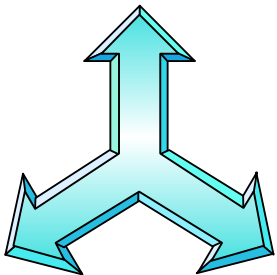


B2B and M2M Connectivity and Emerging Dynamic eCommerce

Speaker: Daniel M. Dias
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USA

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Thao Nguyen, Bob Kearney, Linh Lam, Cait Crawford



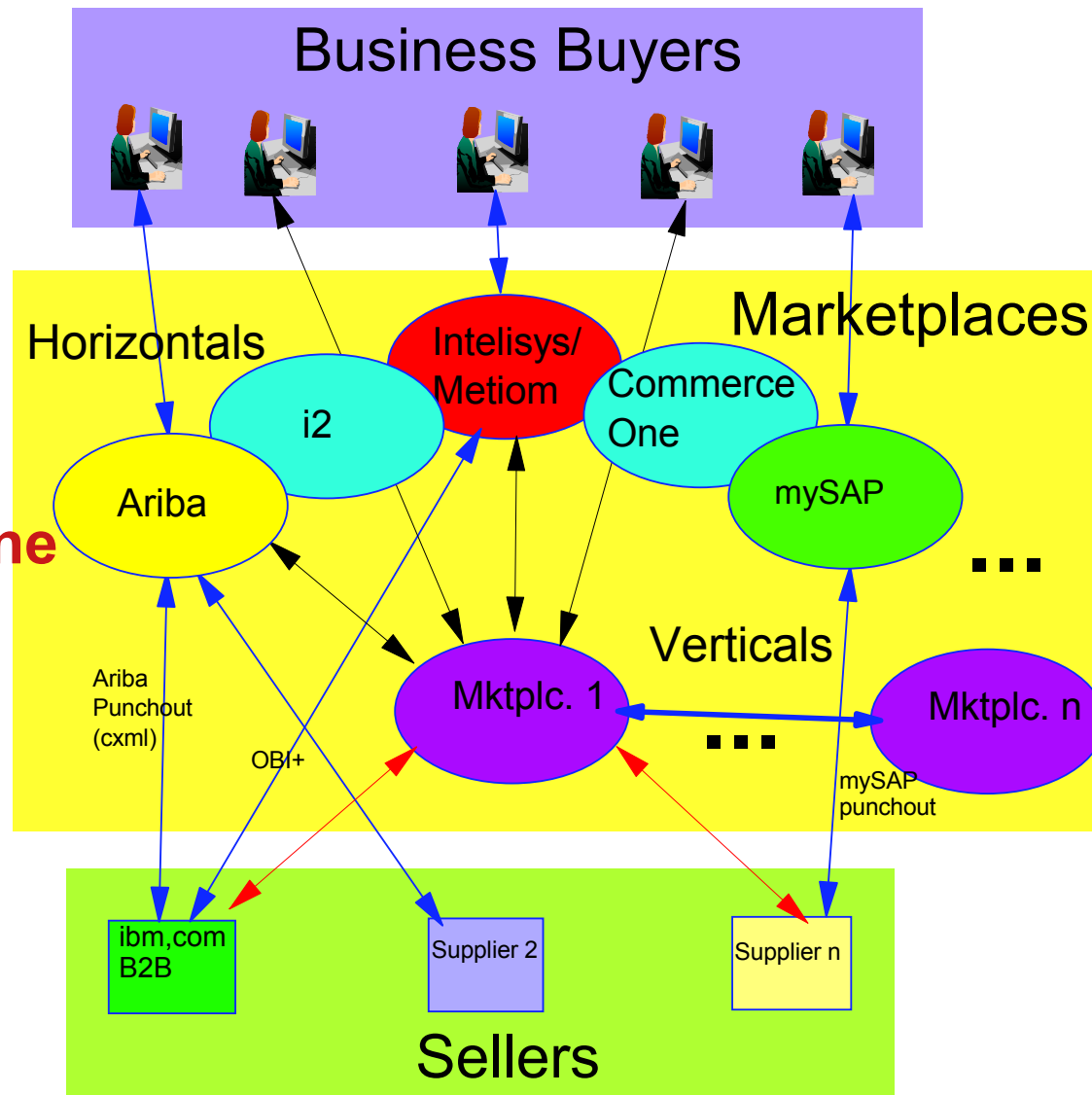
B2B Protocols: Large number and Growing

Proprietary/ Company Defined

- Ariba
- Punchout;
cXML
- Commerce One
round-trip;
CBL
- mySAP
punchout
- Intelisys
OBI+

Standards/ Consortia

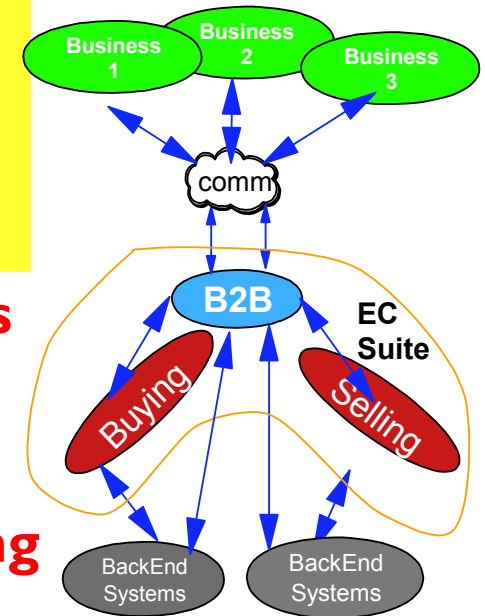
- EDI/
Internet-EDI
- OAG
- OBI
- RosettaNet
- ebXML
- tpaML
- SOAP
- UDDI



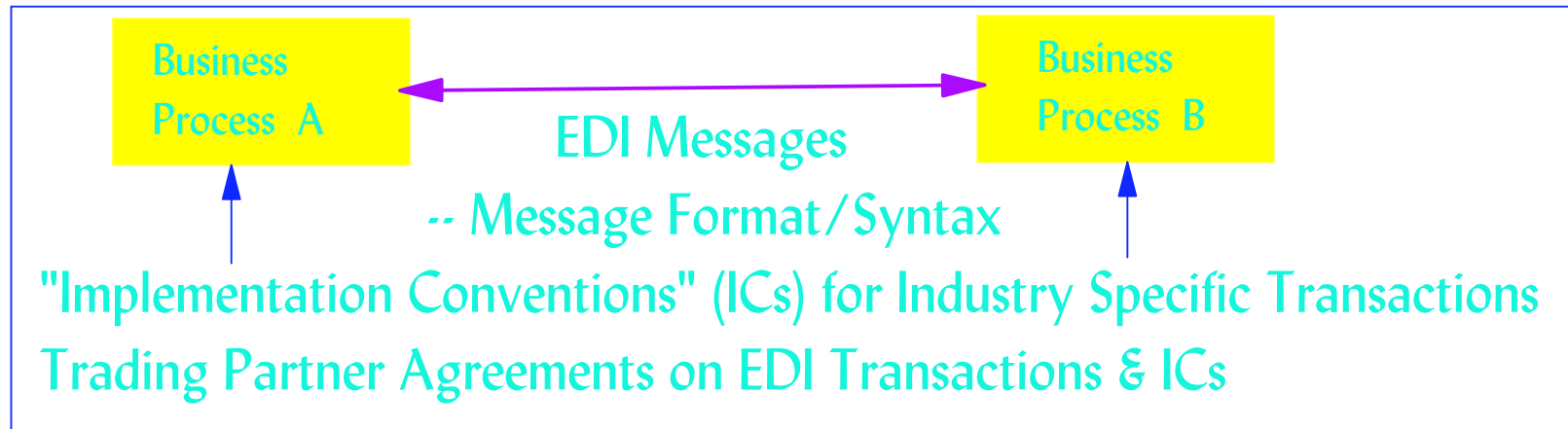
Fulfillment and Supply Chain Processes

Outline of Presentation

- **Summary of Emerging B2B protocols**
 - *Standards / Consortia defined: EDI, OBI, RosettaNet, SOAP, ebXML*
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- **B2B Connectivity Requirements implied by Protocols**
 - *Supplier connectivity to marketplaces, marketplace-to-marketplace connectivity, exchanges*
- **Protocol Composition and Meta-Protocols for defining and instantiating protocols**
 - *Trading Partner Agreement Markup Language tpaML*
 - *Enterprise Business XML standards and tpaML WG*
- **Dynamic eBusiness**
 - *B2B life-cycle definition and "spontaneous" connectivity*

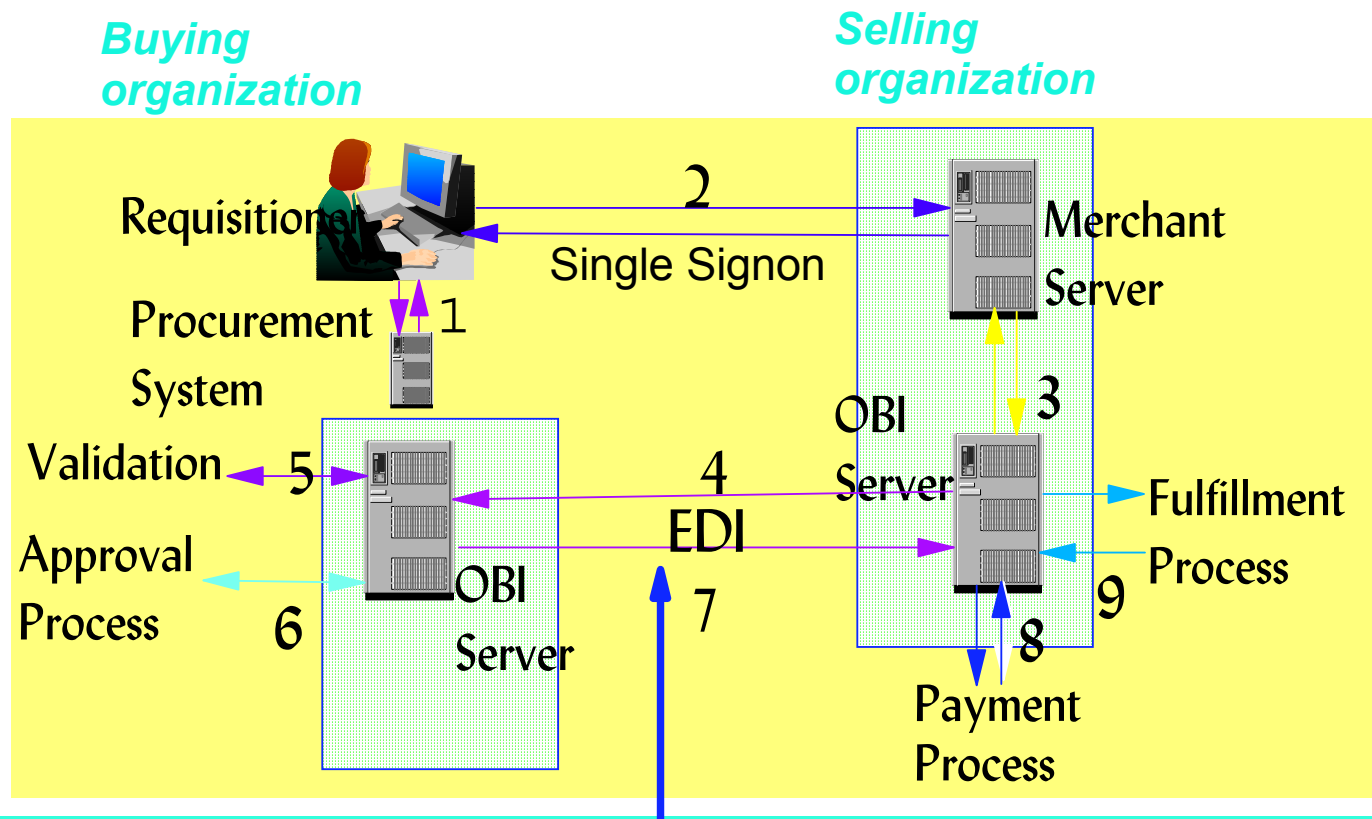


Background and Environment



- EDI is legacy for Business-to-Business electronic commerce
 - Open EDI being proposed as paradigm shift
 - * Shift the focus to Business Processes
 - OBI (Open Buying on the Internet), RosettaNet proposed standards
 - * End-to-end process flow with EDI-equivalent messages
- => Move from messaging formats to end-to-end business processes
- Move from VANs to Internet

Open Buying on the Internet (OBI)

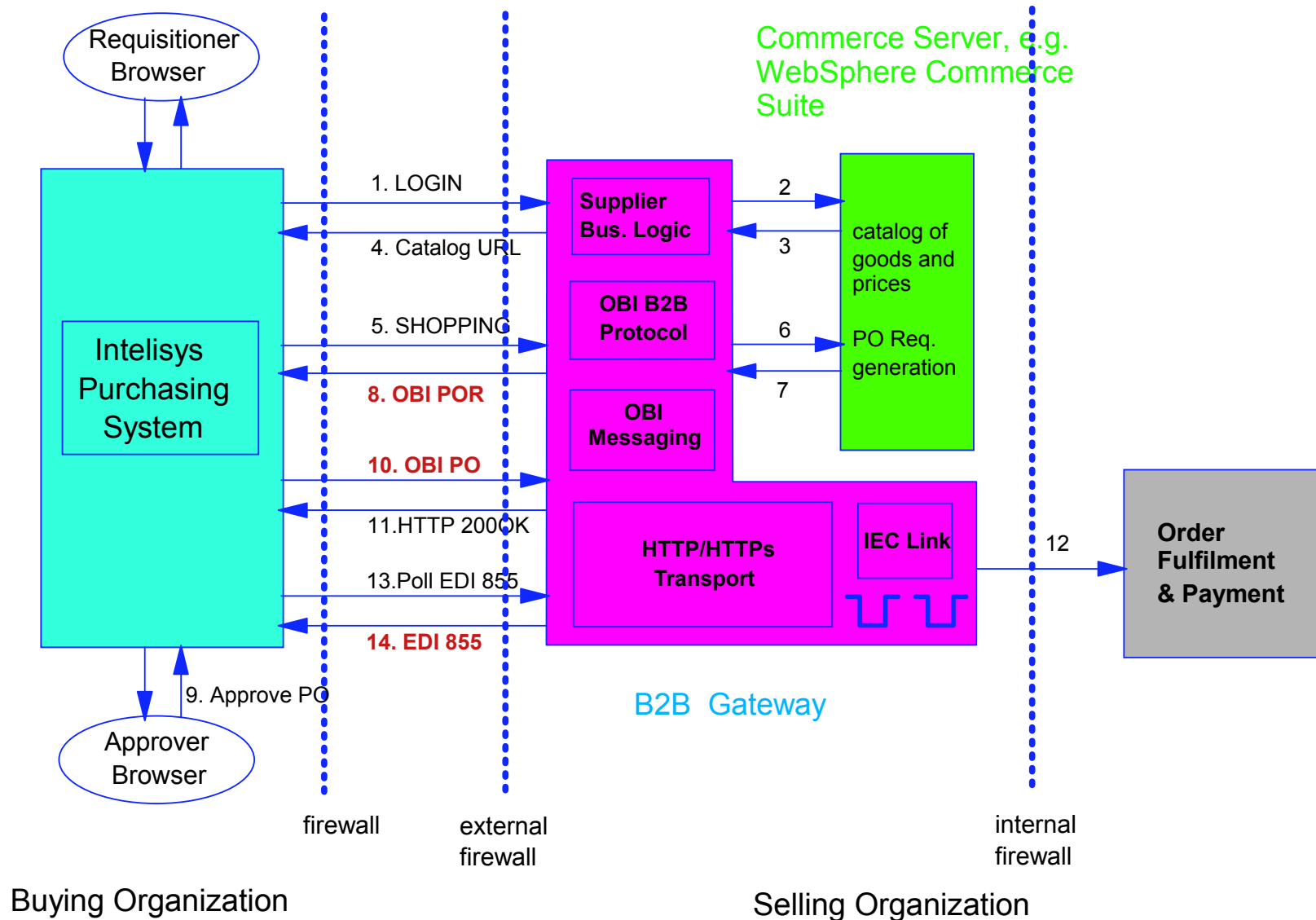


HTTPS, Certificate-based authentication, optional non-repudiation, base 64 encoding, EDI format;
not specified -- retries, duplicate detection/idempotency, asynchronous response times, status queries, order confirmation, invoice...

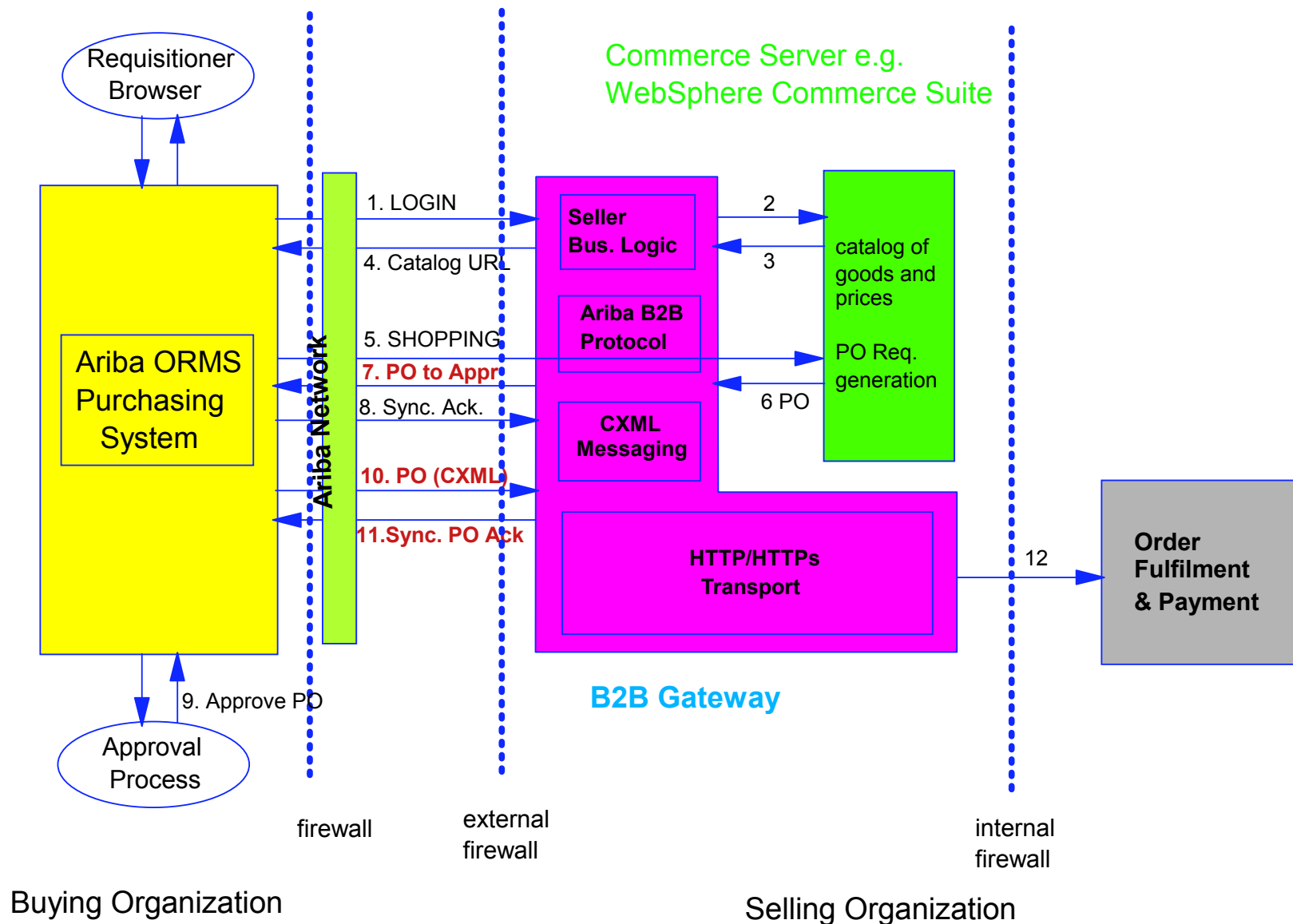
Various Derivatives from OBI

- e.g. Ariba Punchout, RosettaNet Purchasing PIP

Intelisys/Metiom OBI (+) Protocol for B2B Procurement



Ariba Punchout Process for B2B Procurement

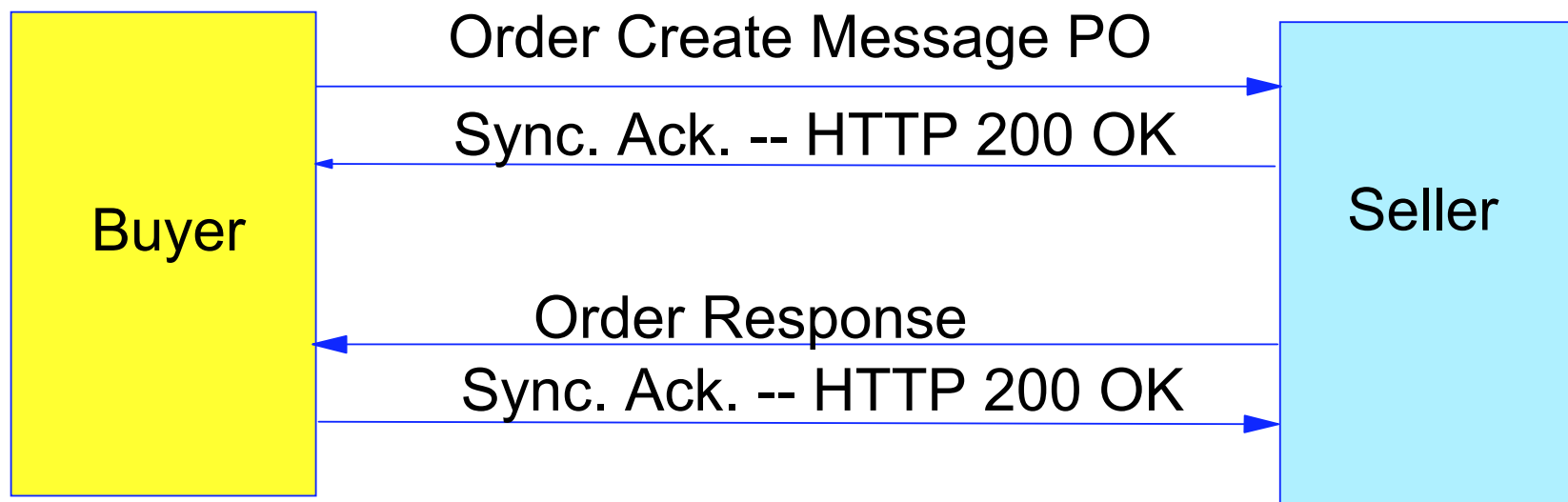


RosettaNet

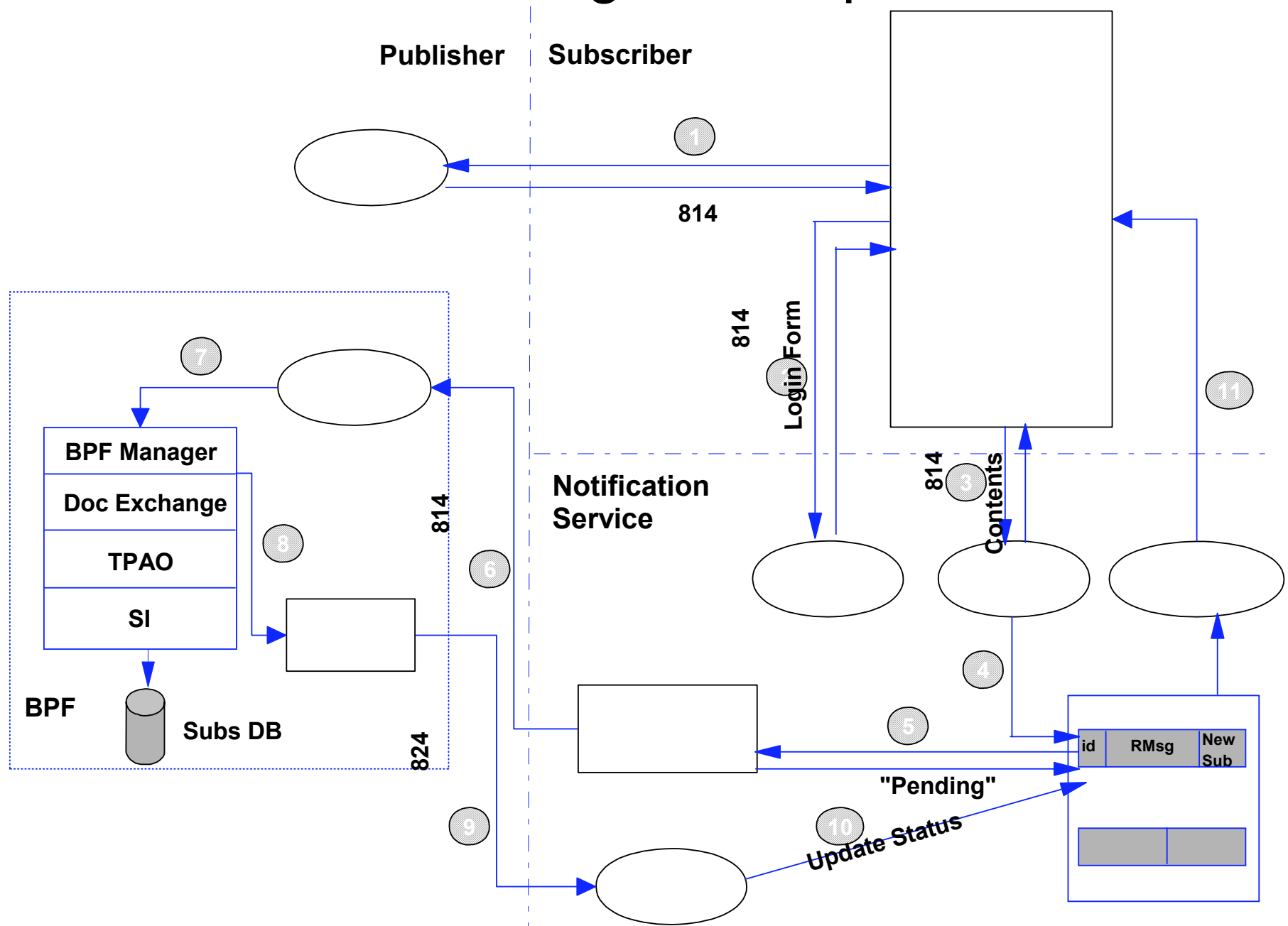
- **RosettaNet Consortium is Defining Partner Interface Processes (PIPs) originally for IT Supply Chain**
- **Defined as Clusters -> Segments -> PIPs**
 - **Cluster 0: Support; Segment A Admin.; PIP01A (failure)**
 - **Cluster 1: Partner, Product and Service Review**
 - **Segment A: Partner Review; PIP1A1,2 Acct. setup, maintain**
 - **Seg. B: Product and Service Review**
 - **Cluster 2: Product Introduction**
 - **Seg. A: Prep. for Distrib.; PIP2A1-8, distrib., query**
 - **Seg. B: Prod. Change; PIP2B1-5, change prod., mkt., sales, tech.**
 - **Cluster 3: Order Management**
 - **Seg. A: Quote & Order entry; PIP3A1-7, req. quote, query price and avail., transfer shopping cart, PO, order status, PO acc.**
 - **Seg. B Transp. & Distrib; seg. C returns & finance; seg. D Config.**
 - **Clus. 4: Inventory mgmt; Clus. 5 Mkt. info; Clus. 6 Service & Support**

RosettaNet Manage Purchase Orders PIP

- Principal messages in PIP
 - Order Create
 - Order Change
 - Order Cancel
 - Similar flow for each message

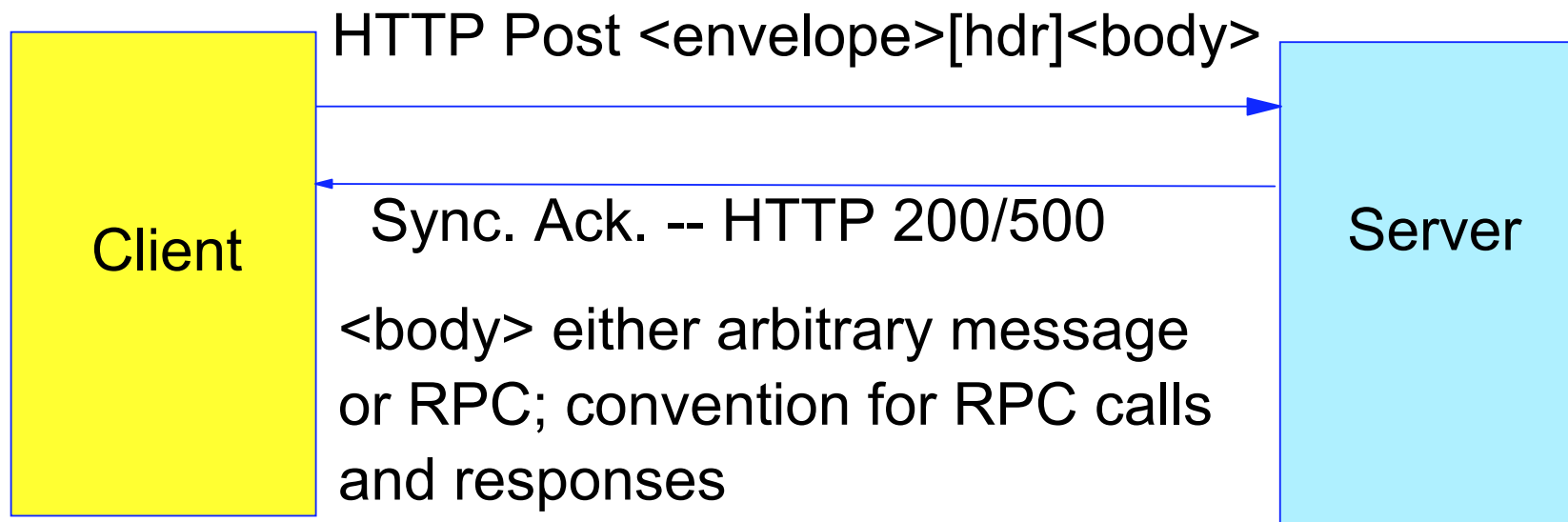


RosettaNet Catalog Subscription PIP



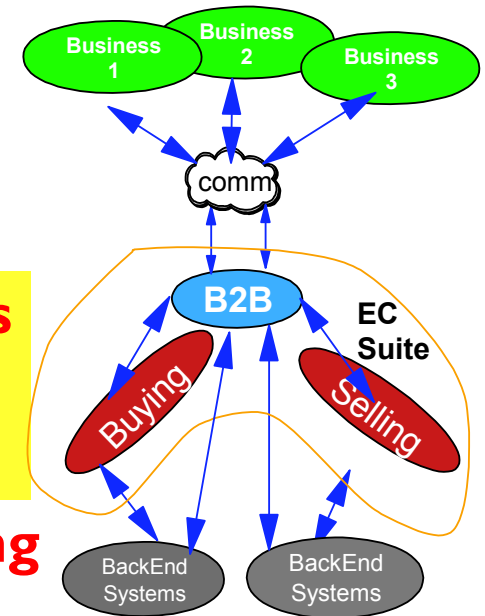
Simple Object Access Protocol - SOAP

- SOAP proposal submitted to W3C by Microsoft, IBM, others
 - XML-based lightweight protocol for distributed info. exch.
 - Defines envelope for describing what is in msg., encoding rules for app. defined data types, and RPC conventions
 - SOAP is stateless; no bi-di communications specified
 - Needs Security and other extensions for use in B2B env.



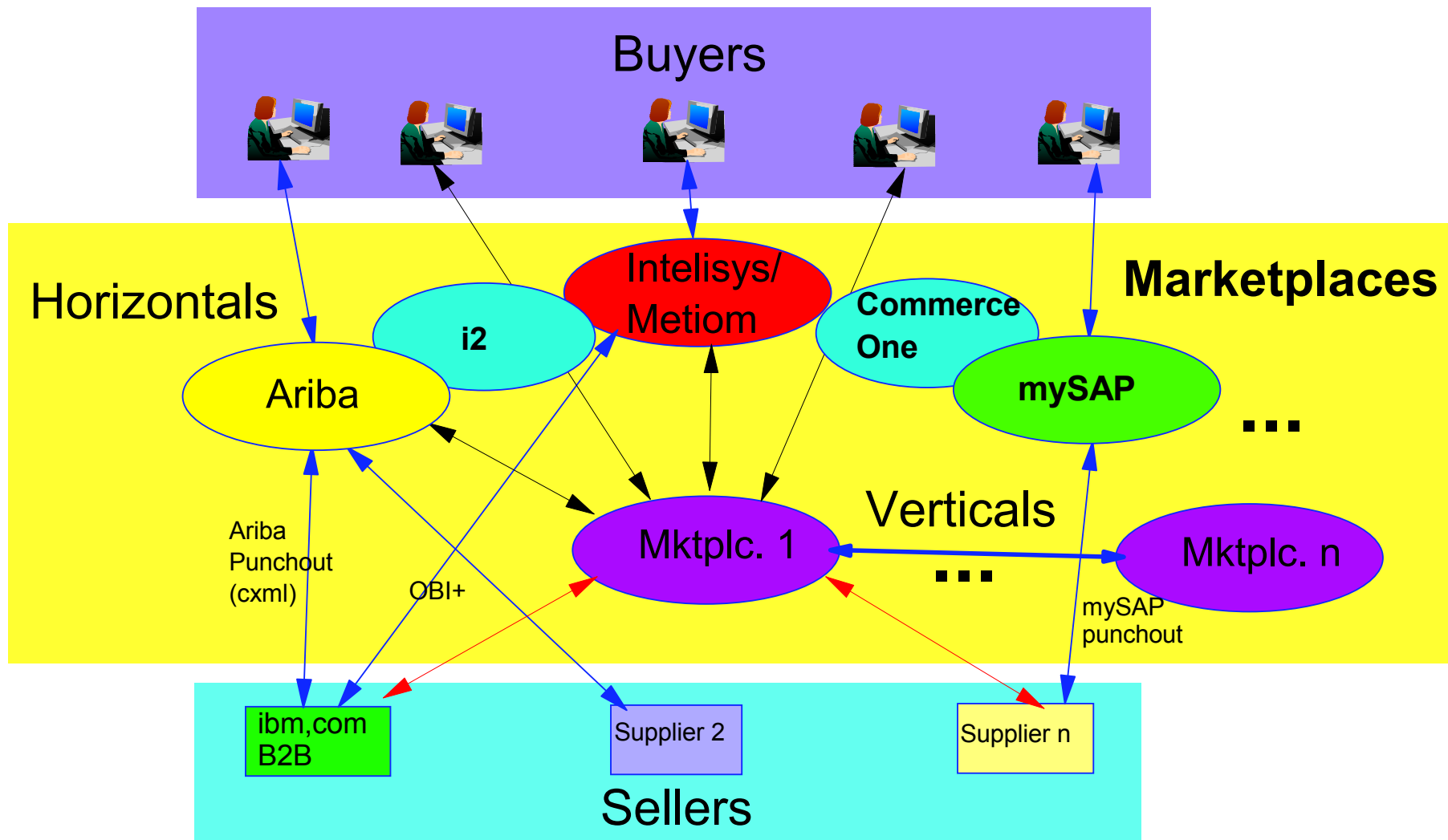
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B2B Connectivity to Marketplaces: The Problem

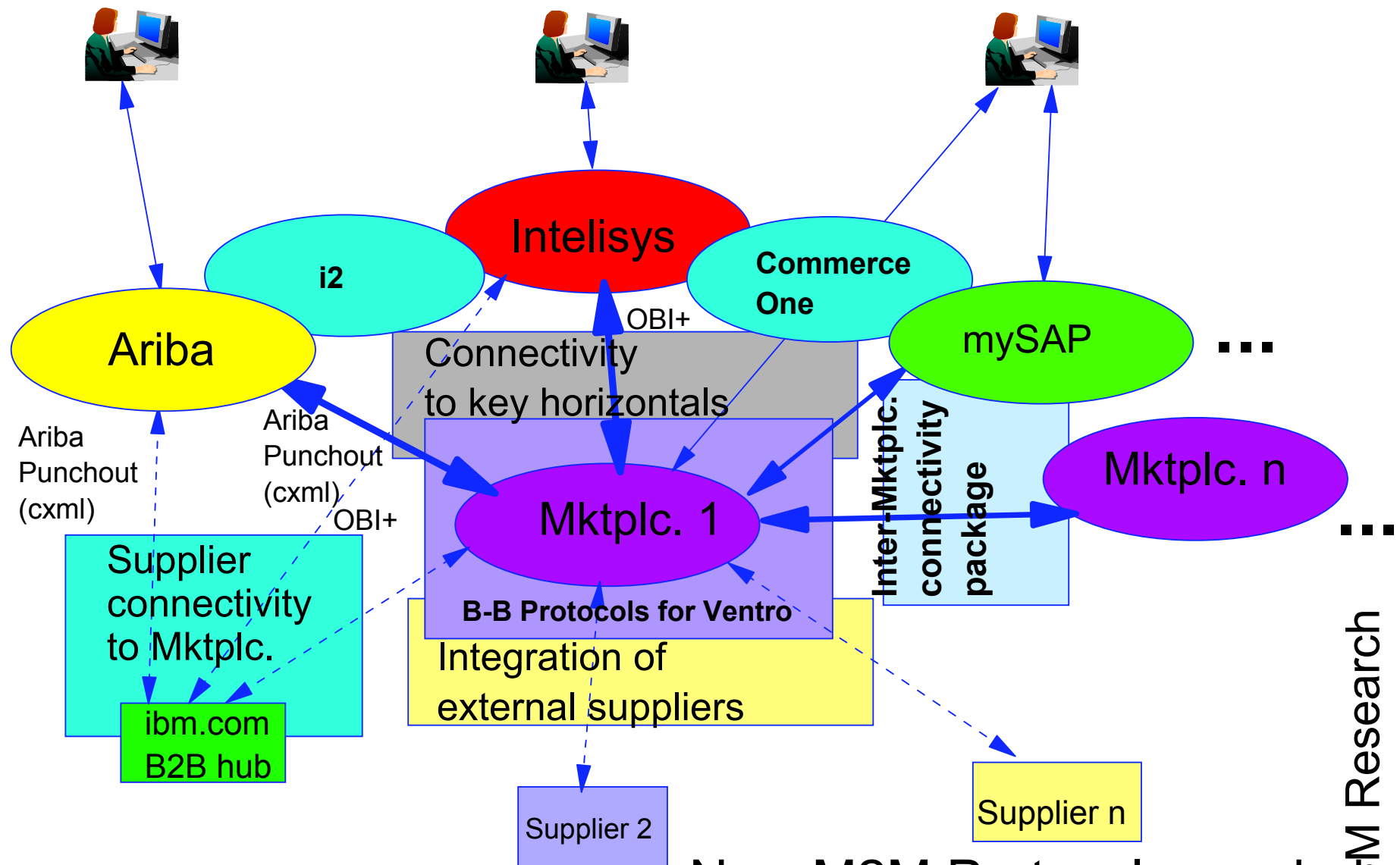
- Many Buyers have selected a horizontal /procurement network
- Different protocols for each network
- Need to support a growing number of B2B protocols



The diagram illustrates the B2B market structure, showing the flow of goods and services between Buyers and Sellers through various Marketplaces. The market is divided into three main categories: Horizontals, Verticals, and Marketplaces.

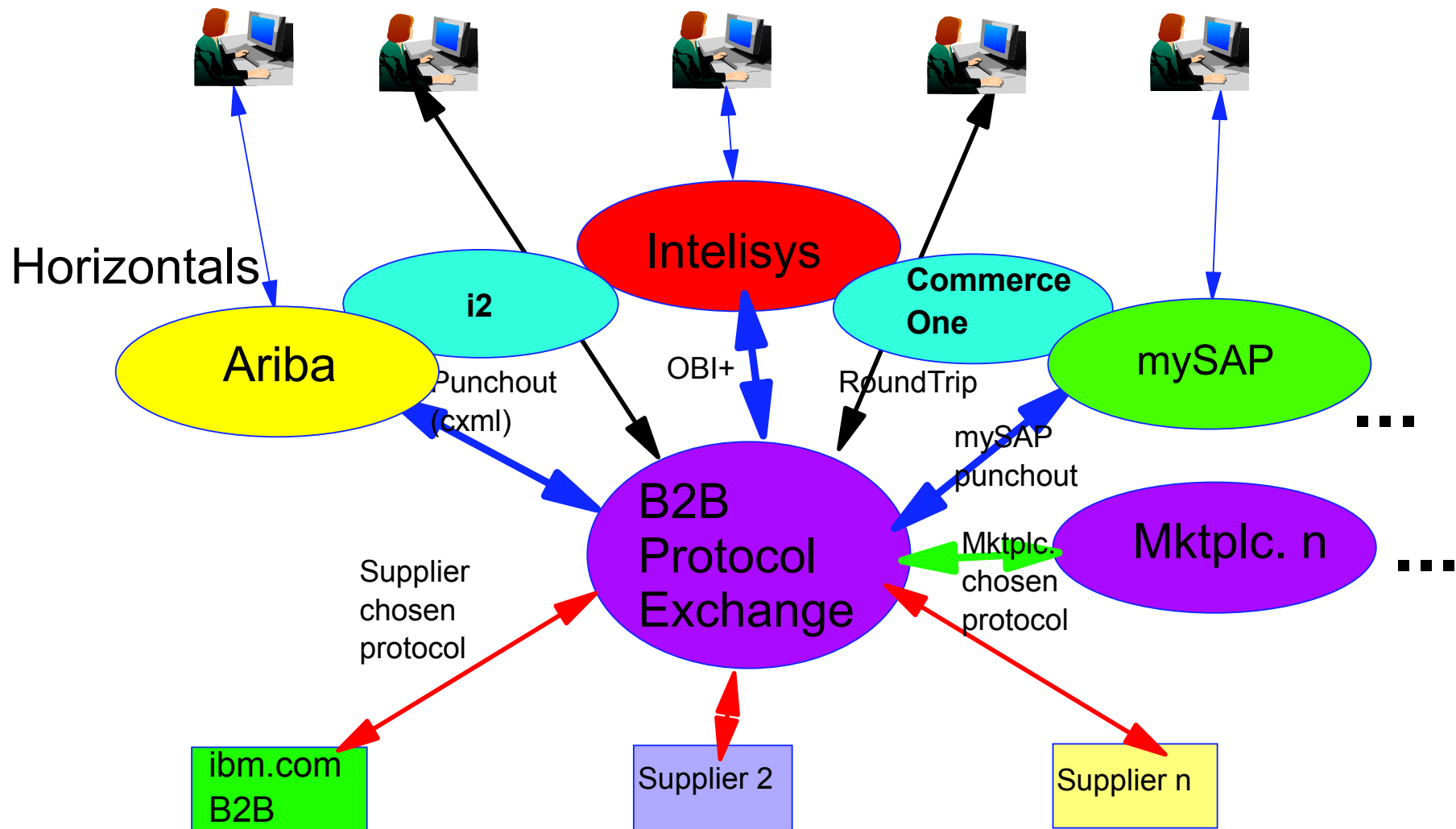
- Buyers:** Represented by icons of people at computers at the top of the diagram.
- Sellers:** Represented by icons of people at computers at the bottom of the diagram.
- Marketplaces:**
 - Horizontals:** Includes Ariba (yellow oval), i2 (cyan oval), and Intelisys (red oval).
 - Verticals:** Includes Commerce One (cyan oval) and mySAP (green oval).
 - Marketplaces:** Includes Marketplc. (purple oval).
- Connectivity:** A cyan box at the bottom left labeled "Connectivity" and "key marketplaces" contains Supplier1 (green box) and Supplier n (yellow box).
- Interactions:**
 - Buyers and Sellers are connected to the Marketplaces.
 - Marketplaces are interconnected with each other (e.g., Ariba to i2, i2 to Intelisys, Intelisys to Commerce One, Commerce One to mySAP, mySAP to Marketplc., and Marketplc. to Ariba).
 - Marketplaces are connected to Suppliers (e.g., Ariba to Supplier1, i2 to Supplier1, Intelisys to Supplier1, Commerce One to Supplier n, mySAP to Supplier n, and Marketplc. to Supplier n).

Marketplace Connectivity Requirements



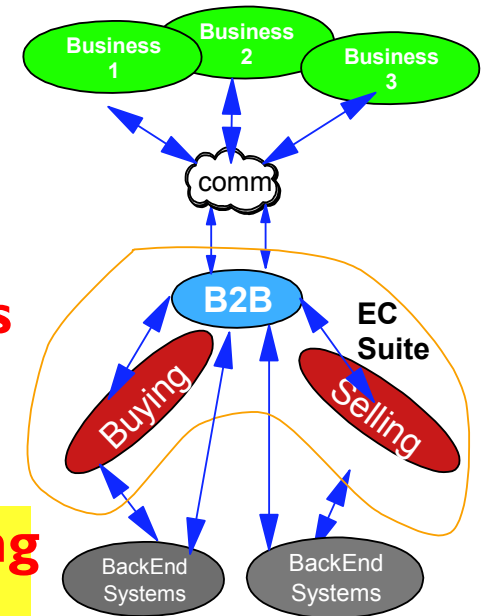
New M2M Protocols needed

B2B Protocol Exchange Requirement

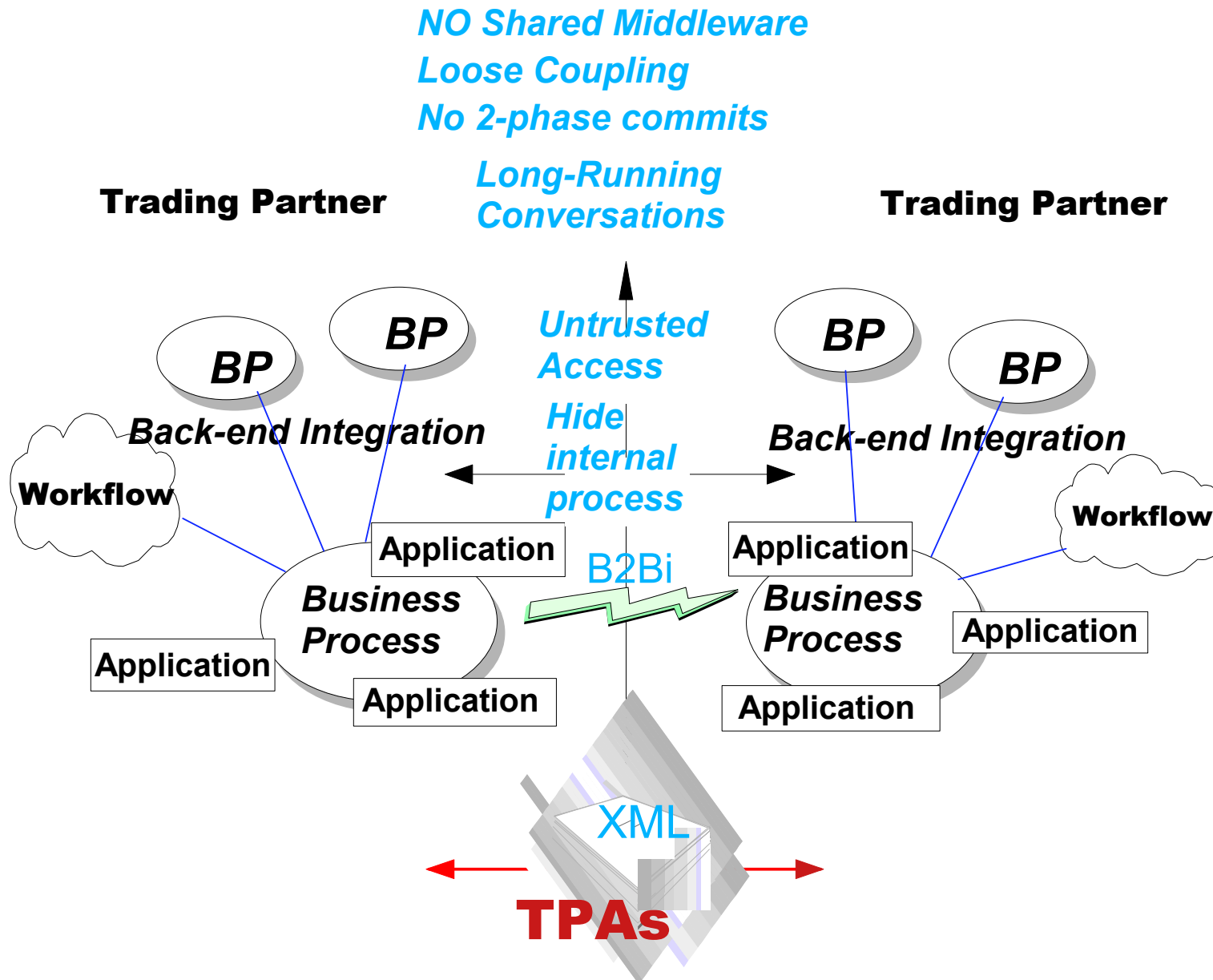


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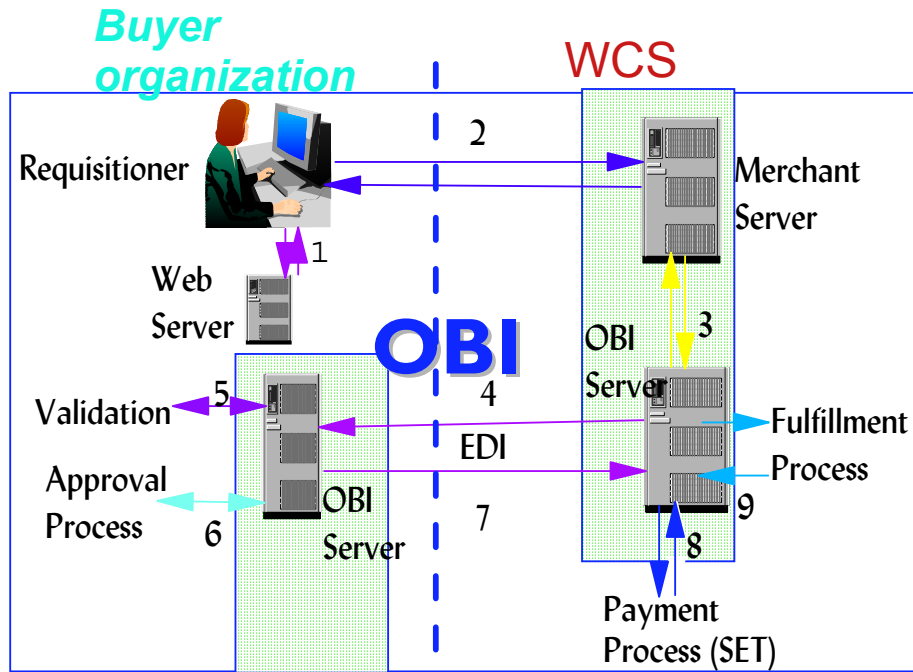
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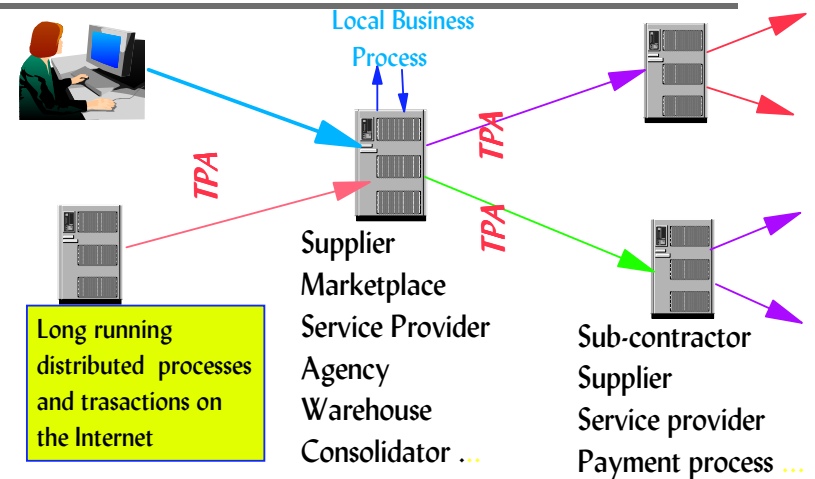
Inter-enterprise Integration



B2B Architecture



General B2B Process Flow

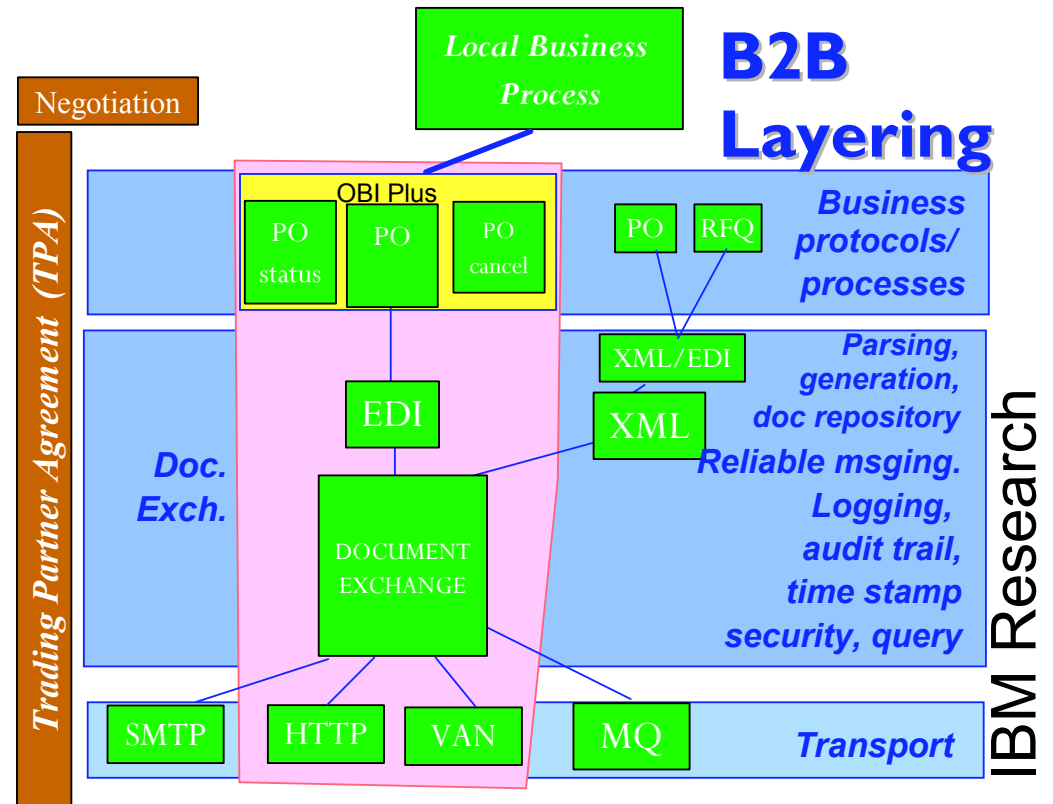


TPA/ Service Contract

Overall properties
Identification
Comm. properties
Security properties
Roles
Actions
Responsiveness
Sequencing rules
Constraints
Recourse actions
Error handling
Legal text

Examples

// Contract duration
// Business partner info.
// HTTP, SMTP, etc.
// Authentication, non-repudiation
// Buyer, seller, broker, etc.
// Reserve, modify, etc.
// Timeout
// Modify after reserve
// Modify before 6 p.m
// Refund, etc.
// Retries, actions invoked
// Penalty if unreachable



Key TPA Elements To Be Specified

Examples

Overall properties
Identification
Communication properties
Security properties
Roles
Actions
Responsiveness
Sequencing rules
Constraints
Recourse actions
Error handling
Comments

TPA duration, Business protocol

Business partner info.

HTTPs, FTP, SMTP, Messaging

Authentication, non-repudiation

Buyer, seller, broker

PO, PO change

Time-out

Change after PO

Change within 24 hours

Refund

Retries, actions invoked

ID of accompanying paper
contract

Formal Specification of TPA Avoids Misinterpretation
Existing protocols specified as special cases

ebXML: Enterprise Business XML

- 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

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 proposal
- Draft tpaML proposal available from <http://xml.org/xmlorg-resources/b2bxml.shtml>

ebXML Trading-Partner Project Team

■ Mission

- Define a specification for creating the IT part of a partner profile and a TPA, which is a combination of two partner profiles
- Enable automated configuration generation from TPA

■ TPA

- IT configuration file, specifies only things that TRP messaging service can manage and enforce
- No business information
- No business semantics except message names/schemas and sequencing rules
 - Derive from BP metamodel

XML based TPA Structure

```
<TPA>
  <TPAInfo>
    <!--TPA name, participants, etc.-->
  </TPAInfo>
  <Transport>
    <!--communication, transport security-->
  </Transport>
  <DocExchange>
    <!--message formats, message security-->
  </DocExchange>
  <BusinessProtocol>
    <!--Action Menu for each party-->
  </BusinessProtocol>
</TPA>
```


Key Document-Exchange Elements

- Message encoding
- Option to check for duplicate messages
- Message Retries
- Message security
 - Nonrepudiation
 - certificates
 - Digital envelope
 - certificates

Key Transport Elements

■ Communication

- Protocol
 - HTTP, SMTP, FTP, VAN-EDI
- Addresses

■ Transport Security

- Encryption definition
- Authentication definition
- Certificates
 - Each party's certificate URL
 - Certificate authorities' certificate URLs
 - Key length

Roles

- TPA may be in terms of actual parties or roles
 - Example of roles: buyer, seller
- Roles used to build prototype TPAs
- Authoring tool or registration tool resolves roles
 - Replace roles by specific parties everywhere in TPA
 - Fill in party-specific information such as addresses

```
<Role>
  <RoleDefn>  <!--1 for each party-->
    <RoleName>rosettanetseller</RoleName>
    <RolePlayer>IBM</RolePlayer>
  </RoleDefn>
</Role>
```

Action Examples

Actions in a TPA are defined by the business application, not mandated by the TPA standard.

■ Actions in a procurement TPA

- Process purchase order
- Modify purchase order
- Cancel purchase order

■ Actions in an airline reservation TPA

- Reservation request
- Modify reservation
- Cancel reservation
- Confirm reservation

Elements of Action Definition

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

Action Definition

```
<Action>
  <Request>
    <RequestName>processOBIPOR</RequestName>
    <RequestMessage>OBIPOR</RequestMessage>
    <Channel ChannelID="name" /> </Request>
  <Response>
    <ResponseName>name</ResponseName>
  </Response>
  <ExceptionResponse>
    <ExceptionResponseName>name
    </ExceptionResponseName>...
  <ResponseServiceTime>
    <ServiceTime>time</ServiceTime>
  </ResponseServiceTime>
  <Sequencing>
    ...
</Action>
```

Sequencing Rules

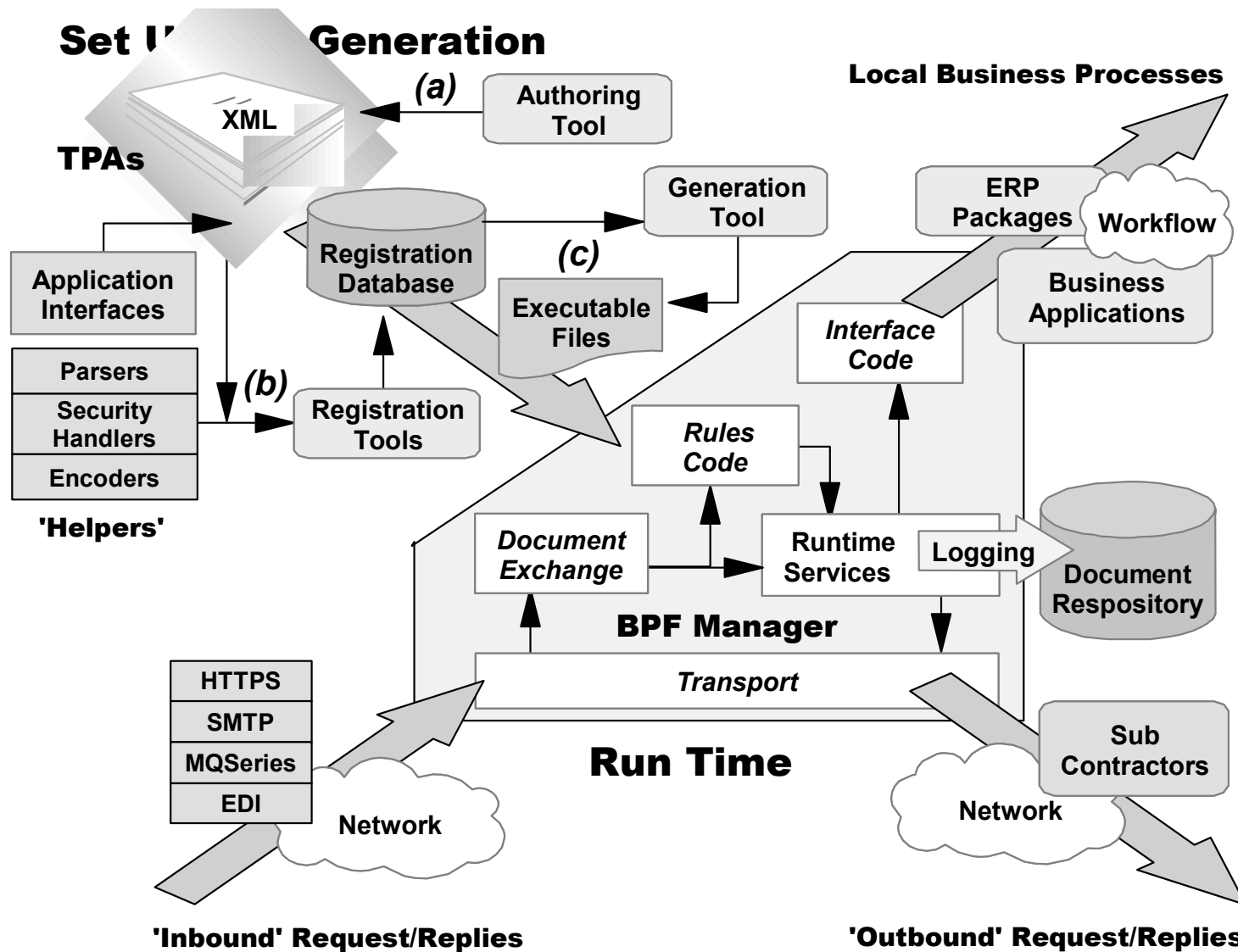
■ Directly under Service Interface tag

```
<StartEnabled>  
  <RequestName>action_name</RequestName>  
  <!--one for each action allowed as initial action-->  
</StartEnabled>
```

■ Inside Action Definition

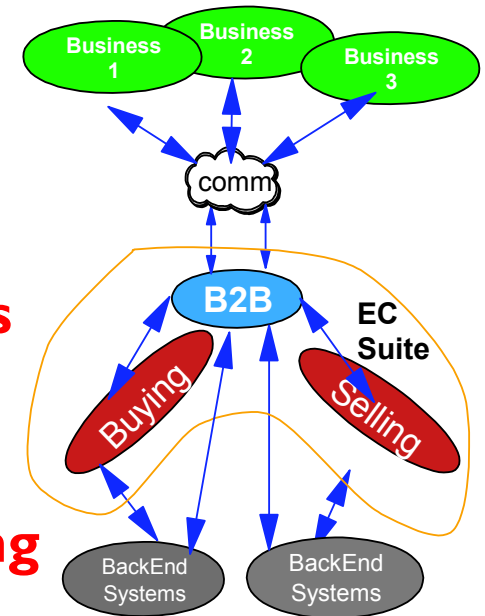
```
<Sequencing>  
  <Enable>    <!--actions permitted after this one-->  
    <RequestName>name_of_action</RequestName>  
    <!--one or more-->  
  </Enable>  
  <Disable>  
    <!--actions not permitted after this one-->  
    <RequestName>name_of_action</RequestName>  
    <!--one or more-->  
  </Disable>  
</Sequencing>
```

B2B Integration Framework and TPAs

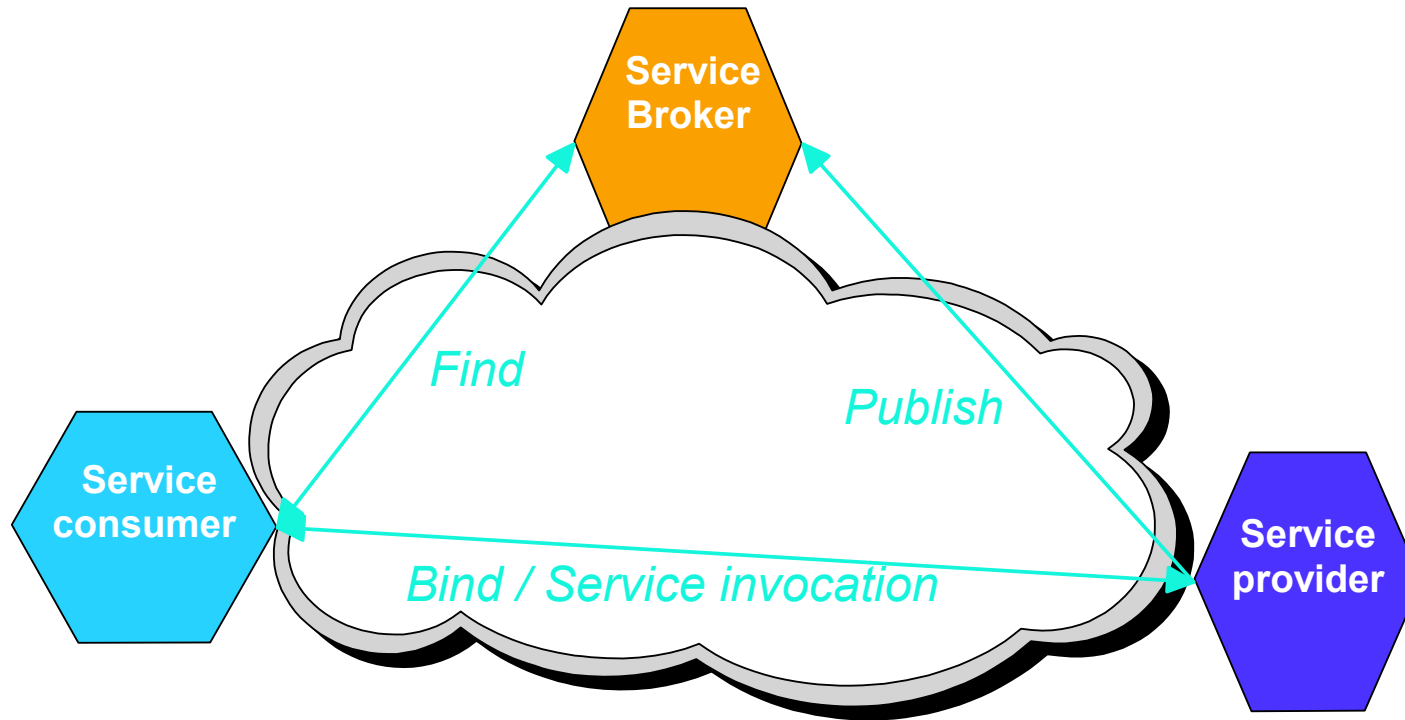


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Vision of Spontaneous e-Commerce



Locate services provided by other businesses, create agreement and invoke services

- ▶ **Quick and easy business-to-business integration**
- ▶ **Dynamic business processes**
 - ▶ **partner discovery and selection, negotiation of terms & conditions, contracts, connectivity set-up, order/message flow, fulfillment...**

Universal Description, Discovery, and Integration: UDDI

- **UDDI spec. released Sept. 6/00 by Ariba, IBM and Microsoft**
- **UDDI provides Web-based registries for business description, discovery and interfaces**
 - *White Pages: Business name, text description, contact info. (names, phone #, Web sites, etc.), identifiers (e.g. DUNS number)*
 - *Yellow Pages: Business categories; 3 taxonomies in VI,
 - *Industry: NAICS (US Govt.), Prod./Svc.: UN/SPSC (ECMA), Location**
 - *Green Pages: Business services, service descriptions, binding info.
 - *tModel provides reference to info. on spec. of interface*
 - *tpaML template could be a tModel for B2B service**
 - *UDDI API provides functions for registering and finding information
 - *SOAP messaging over HTTP used to access UDDI service**

Automatic Contract Enabling System(ACES)

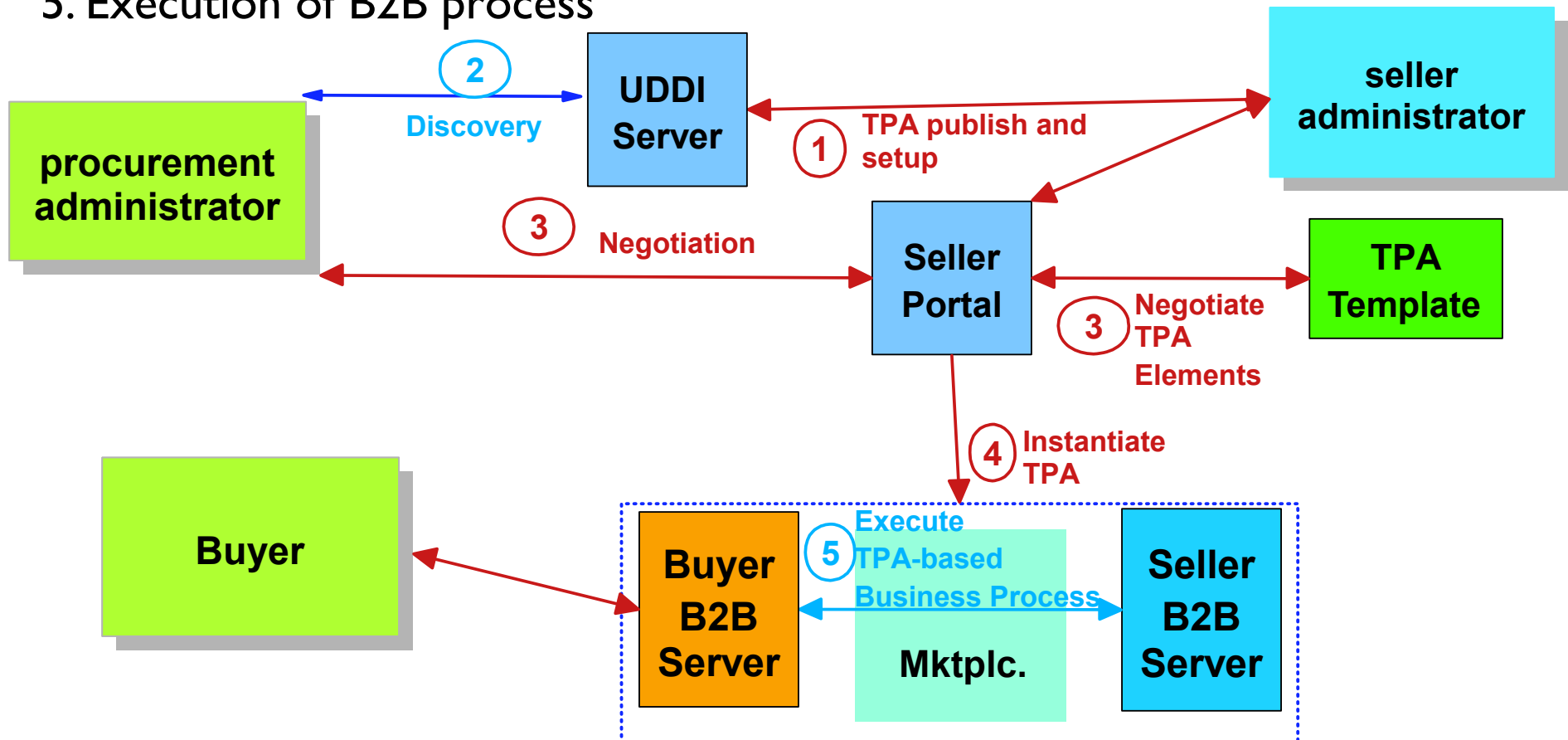
■ ACES Objectives

- Definition of automated contracts
- Registration and discovery of partner profiles
 - Could be done using UDDI
- Negotiation of contract
 - Protocols, business parameters
- Tools/infrastructure
 - Automate contract setup process

TPA/Service Negotiation Prototype:

Remote partner registration

1. TPA/service template creation/setup
2. Service advertisement/discovery
3. TPA/service negotiation
4. TPA/service agreement submission/approval/registration/instantiation
5. Execution of B2B process



Summary and Conclusions

- **A large number of B2B conn. protocols emerging**
 - EDI, OBI, RosettaNet, SOAP, ebXML, UDDI, Ariba punchout, Intelisys/OBI+, mySAP punchout, etc.
- **Connectivity becomes complex to implement**
 - Supplier connectivity to marketplaces, marketplace-to-marketplace connectivity, exchanges
- **These Protocols can be composed, specified and quickly implemented using tpaML**
 - tpaML is being standardized under ebXML
- **Dynamic eBusiness is emerging as a new paradigm**
 - B2B specification, discovery, negotiation, and set-up for "spontaneous" connectivity

