XML in Electronic Commerce - Through the Rearview Mirror and Crystal Ball

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Outline

- The Vision of "Plug and Play" Commerce

- The Integration Challenge

- XML for Interoperability of Commerce Applications

- The Common Business Library

- Technology for "Plug and Play" Commerce

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The Vision of
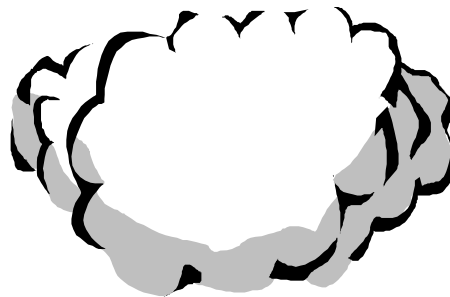# "Plug and Play" Commerce

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The XML Revolution in Electronic Commerce

- Today's Web sites publish information for people
  - "eyes-only" is dominant design perspective
  - hard to search
  - hard to automate processing
- Tomorrow's sites will provide information and services for computers (and people)
  - Overcomes HTML's inherent limitations
  - Enables the new business models of the network economy

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The XML Revolution in Electronic Commerce
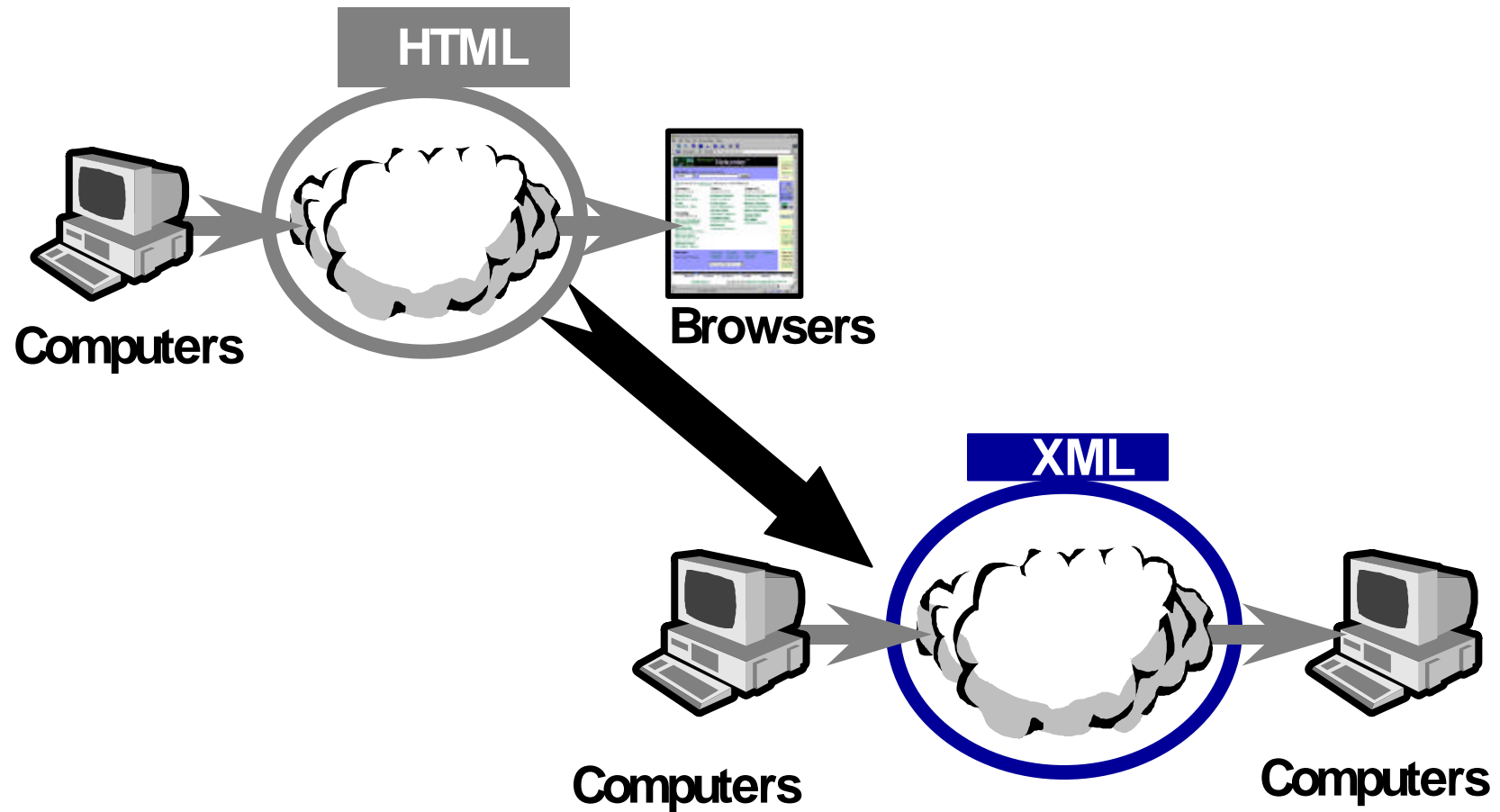
Plug-And-Play Commerce

Plug-And-Play Commerce

Plug-And-Play Commerce

Business Models for Electronic Commerce

- Stores and malls

- Virtual communities

- Purchasing center

- Auctions and reverse auctions

- Value-chain service provider

- Value-chain integrator

- Collaboration and concurrent engineering

- Information brokerage

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Leverage Points

- Streamlining processes through consolidation, aggregation, and automation

- Replacing closed trading partner relationships with open markets

- Introducing new intermediary services such as auctions

- Facilitating interoperation of services via hubs and open standards

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Shared Information –>   Commerce Networks

- Supply Chains

    - Merchants, distributors, manufacturers, brokers, logistics, shippers

- Real Estate

    - Brokers, banks, escrow, title, inspection, MLS, government agencies, classifieds, loan aggregators

- Travel

    - Hotels, airlines, rental car agencies, travel agents

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Networks of Networks ...
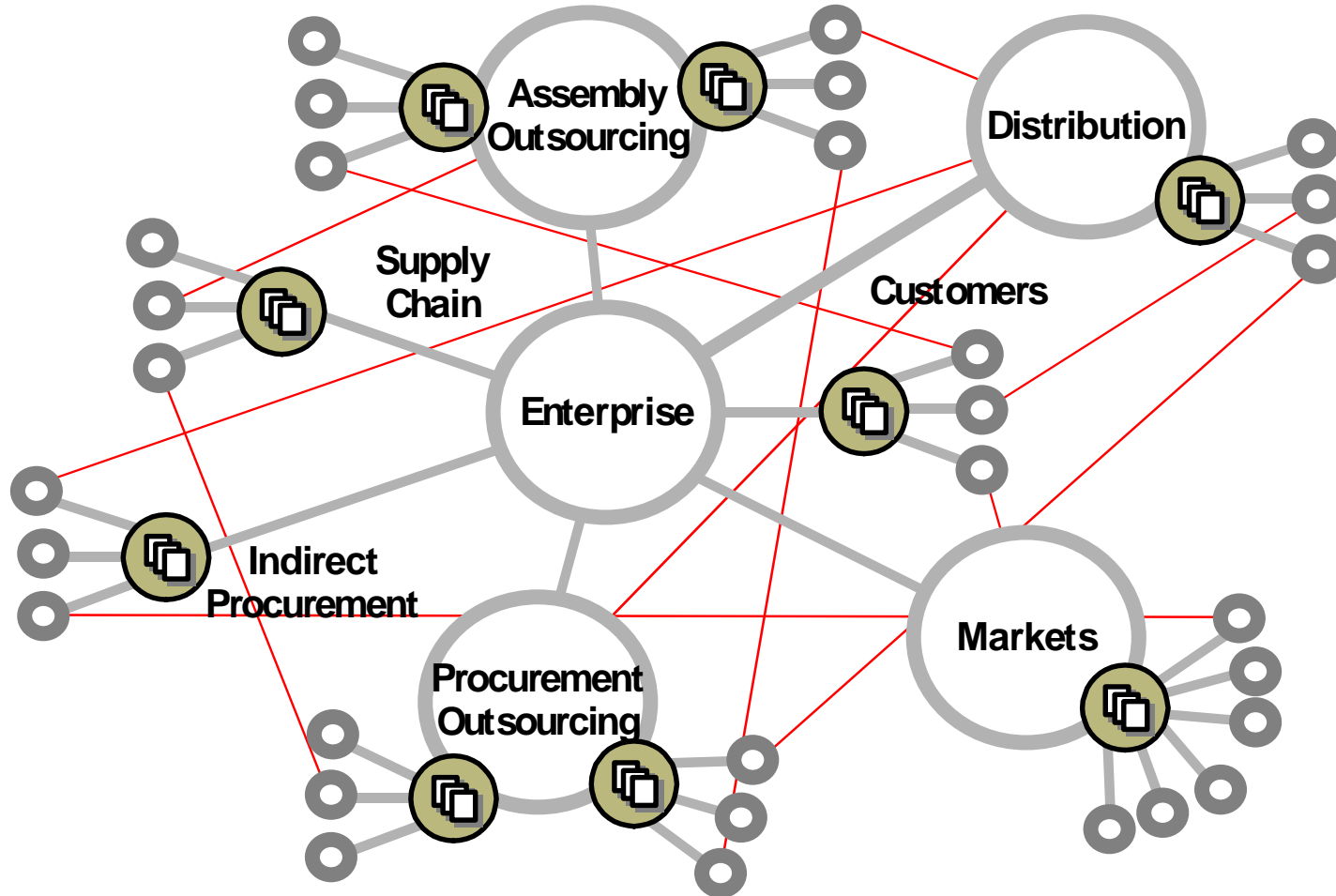
The Integration Challenge

Traditional Supply Chain

| Vendor | Distributor | Reseller | Buyer |

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Business Models and Integration Requirements

- Traditional supply chains represent long-term, point-to-point, and tightly coupled relationships

  - EDI is acceptable here because high integration costs can be recovered over time

  - Partners are more willing to invest in compatible IT infrastructure at each end or in middleware that creates a distributed application

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New Supply Chain -> Supply Mess

| Vendors | Distributors | Resellers | Buyers |
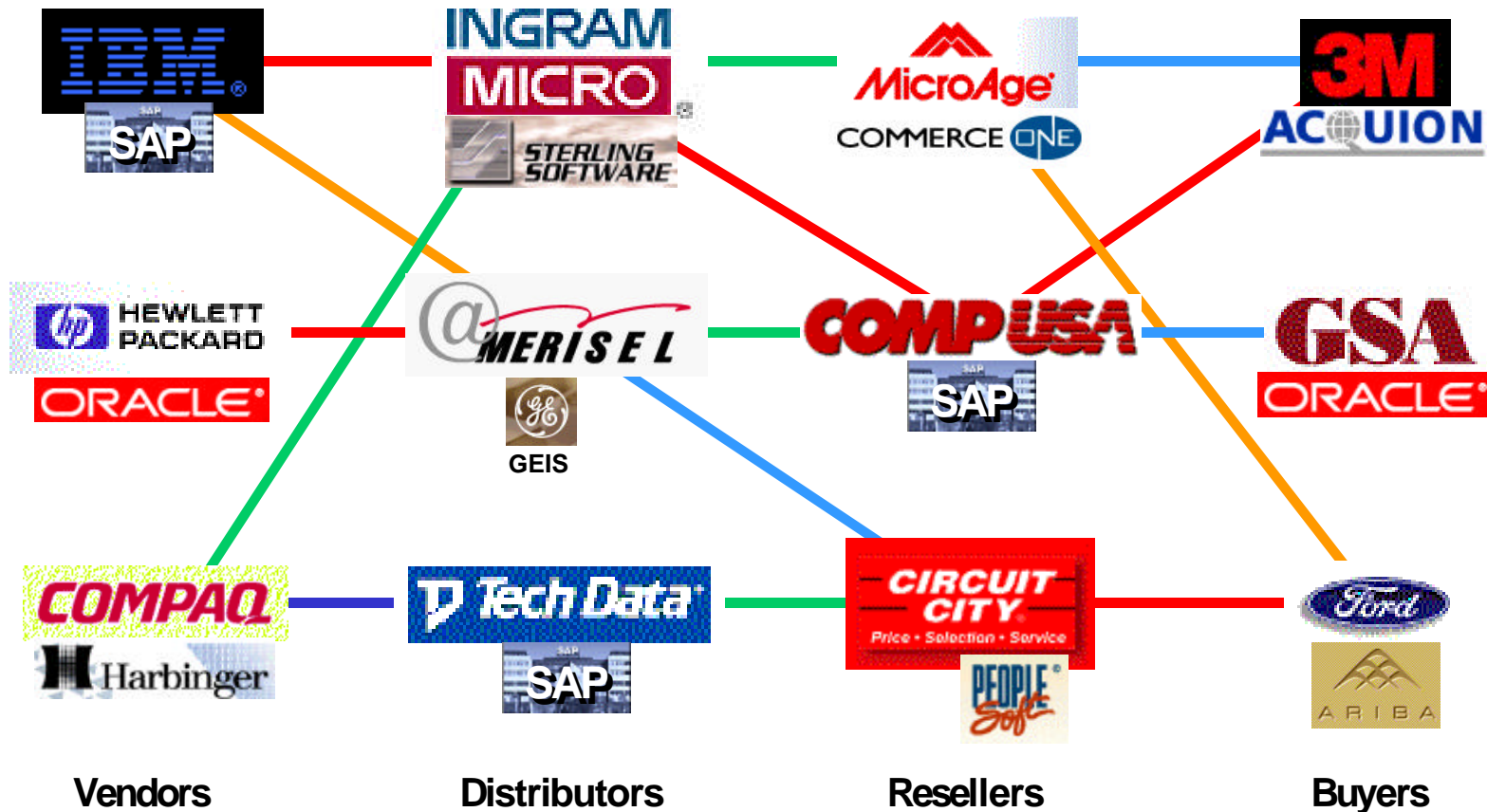
Business Models and Integration Requirements

- Internet enables new models for outsourcing, open sourcing, trading communities, buying consortia and "virtual enterprises" that are fundamentally different

    - Relationships are experimental and evolving and have shorter lifetimes overall

    - Both initial integration cost and incremental cost to evolve must be low

    - Point-to-point coupling approaches won't support "describe once, {sell,buy} anywhere" goals

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XML for Interoperability of Commerce Applications

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XML as Technology Platform

.. exchange data in an application and vendor neutral format

XML

WEB **EDI** **CORBA / COM**

Document based ⟵⟶ **API based**

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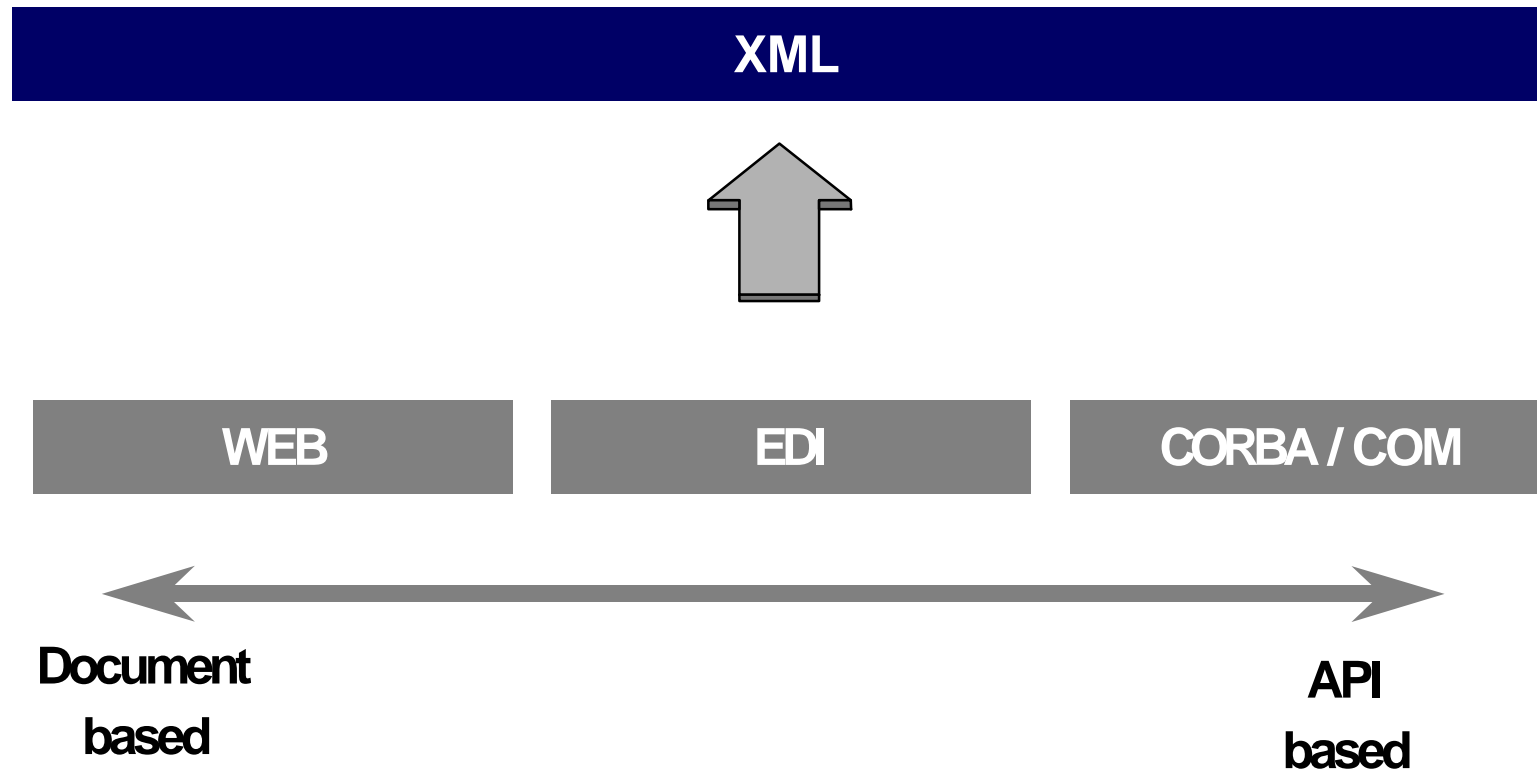
Benefits of XML to Business

- Businesses can describe services in a manner that can be easily understood

- One set of documents, forms and messages can be exchanged by businesses with different internal business systems

- Errors in re-keying data are reduced because data can be transformed through gateways

- Frequent changes in business process can be handled without substantial engineering costs

- Leverages investment in legacy systems and can be used with latest Internet technology

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XML's Big Idea: Document Types

- Customer Profiles

- Vendor Profiles

- Catalogs

- Datasheets

- Price Lists

- Purchase Orders

- Invoices

- Inventory Reports

- Bill of Materials

- Contracts

- Credit Reports

- Bank Statements

- Directories

- Transportation Schedules

- Receipts

- many many more...

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Laptop Computer Catalog Entry

Laptop Computer

IBM Thinkpad 560X

233 Mhz

32 Mb

4 Gb

4.1 pounds

$3200

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Laptop Computer in HTML

< TITLE> Laptop Computer**< /TITLE>**

< BODY>

< UL>

<LI>IBM Thinkpad 560X

<LI>233 Mhz

<LI>32 Mb

<LI>4 Gb

<LI>4.1 pounds

<LI>$3200

</UL></BODY>

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Laptop Computer in XML

```
<  COMPUTER TYPE= "Laptop">
   <  MANUFACTURER>  IBM<  /MANUFACTURER>
   <LINE>Thinkpad</LINE>
   <MODEL>560X</MODEL>
   <SPECIFICATIONS>
       <SPEED UNIT="MHZ">233</SPEED>
       <MEMORY UNIT="MB">32</MEMORY>
       <DISK UNIT="GB">4</DISK>
       <WEIGHT UNIT="POUND">4.1 </WEIGHT>
       <PRICE CURRENCY="USD">3200</PRICE>
   </SPECIFICATIONS>
</COMPUTER>
```

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Smarter Processing Enabled by XML

- <COMPUTER> and <SPECIFICATIONS> provide logical containers for extracting and manipulating product information as a unit

  - Sort by <MANUFACTURER>, <SPEED>, <WEIGHT>, <PRICE>, etc.

- Explicit identification of each part enables its automated processing

  - Convert <PRICE> from "USD" to Euro, Yes, etc.

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XML Commerce Languages

OBI	Corporate Procurement	AMEX, Office Depot, Boise Cascade
OTP	Retail Payment	Mastercard, Mondex
OFX / GOLD	Personal Finance	(Intuit, Microsoft), (IBM, 125 Banks)
RosettaNet	Computer Supply Chain	Ingram + 24 largest channel players
ICE	Content syndication	News Corp., Sun, Microsoft, Adobe, Vignette, C/Net

This list is growing explosively, and all are using XML (or shortly will be)...

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XML and Metcalfe's Law

- The value of a language depends on how many people (or computers) understand it
- How do you encourage and enable others to understand your language?
- The EDI approach:
  - BIG COMPANY: Speak MY language or I won't do business with you!
  - SMALL COMPANY: Yes, master.
- The XML approach:
  - Excuse me, here are the rules of my language if you'd like to speak with me…

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The Pending Interoperability Crisis

SCOR OBI XML/EDI Gold OTP Pinnacles OFX OMG/CBO HL7 API EDI X.12 VCI CIP EDI-lite IMS ICE OPS
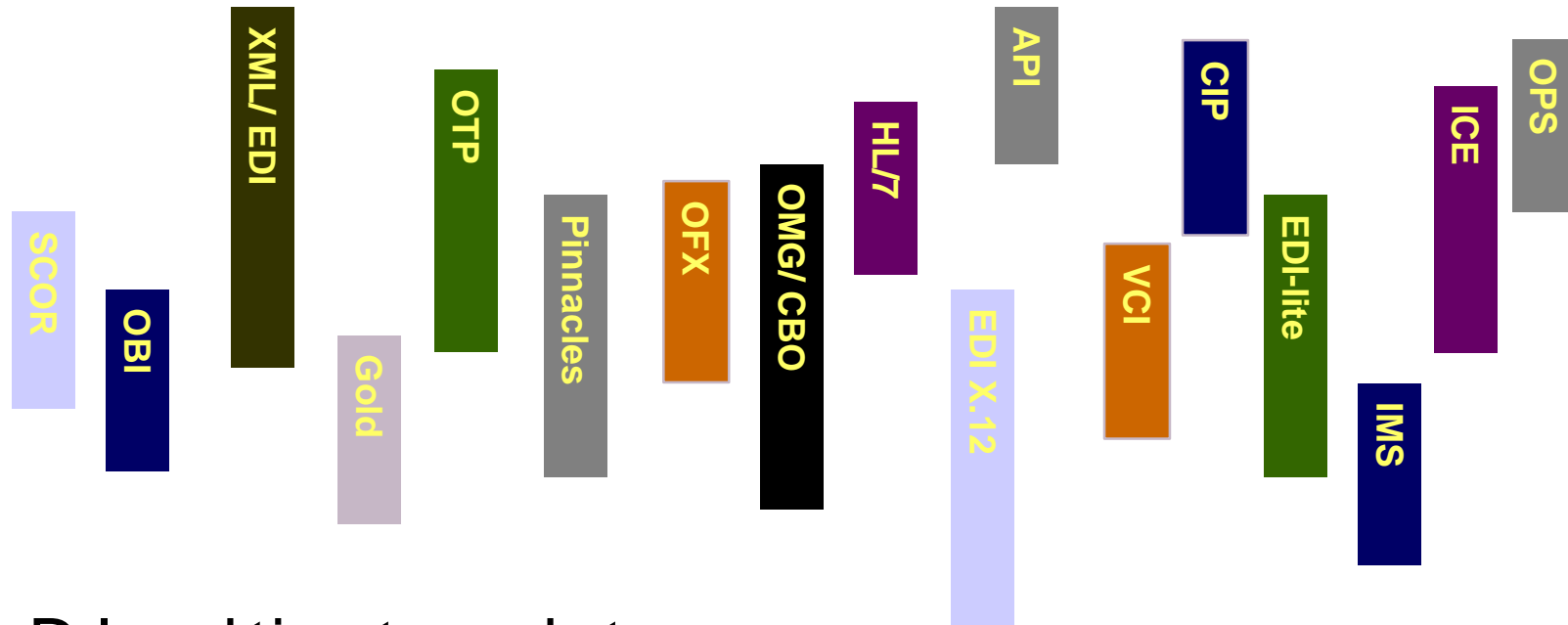
- Delayed time to market

- Redundant development costs

- Limited Interoperability

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The Common Business Library

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Airline Schedule in XML

```xml
<TransportSchedule  Type="Airline">
<Segment Id="United Airlines #200">
    <Location Type="Origin">San
      Francisco</Location>
    <Time Type="Depart" TZ="PST">11:30 </Time>
     <Location
        Type="Destination">Honolulu</Location>
    <Time Type="Arrive" TZ="HST"> 2:30 </Time>
    <Price Currency="USD">368.50</Price>
</Segment>
</TransportSchedule>
```

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"TransportSchedule" vs "AirlineSchedule"

Using the same schema for all scheduled transportation services:

<TransportSchedule Type="Airline">

<TransportSchedule Type="Train">

<TransportSchedule Type="Ferry">

An application could create itineraries that involve more than one service by matching on locations and times

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Shared Semantics for Time and Location

Shared semantics for location and time in all schemas that need them enables richer "commerce networks" of services:

<TransportSchedule Type="Airline> ...

<Location>Honolulu</Location>

<Accommodation Type="Hotel">…

<Location>Honolulu</Location>

<Event Type="Concert">…

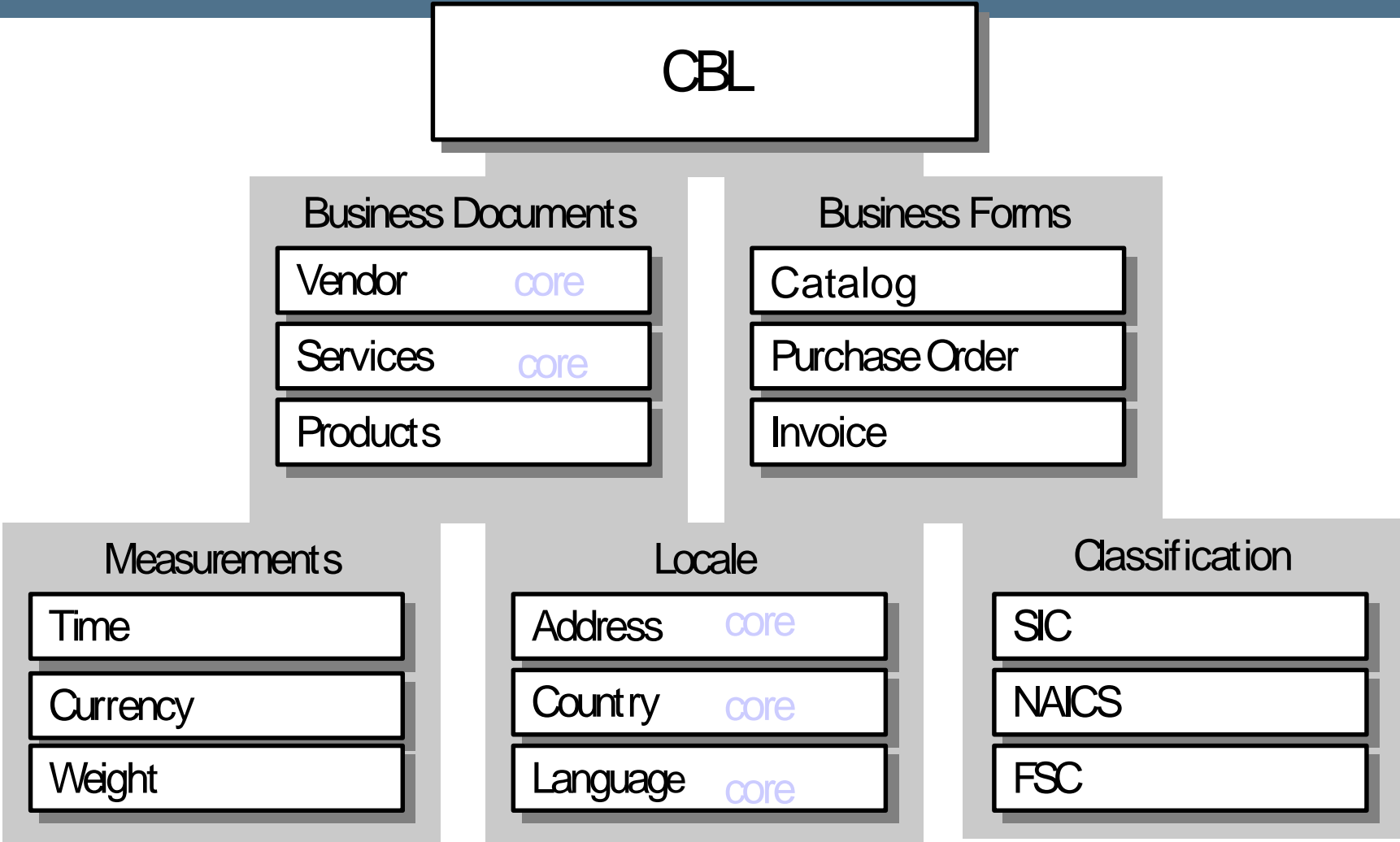**<Location>Honolulu</Location>**

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Solution: Open Framework For Commerce

CBL Building Blocks

CBL

Business Documents
- Vendor — core
- Services — core
- Products

Business Forms
- Catalog
- Purchase Order
- Invoice

Measurements
- Time
- Currency
- Weight

Locale
- Address — core
- Country — core
- Language — core

Classification
- SIC
- NAICS
- FSC

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Composing from Building Blocks

CBL

Business Documents
- Vendor *core*
- Services *core*
- Products

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Locale
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- SIC
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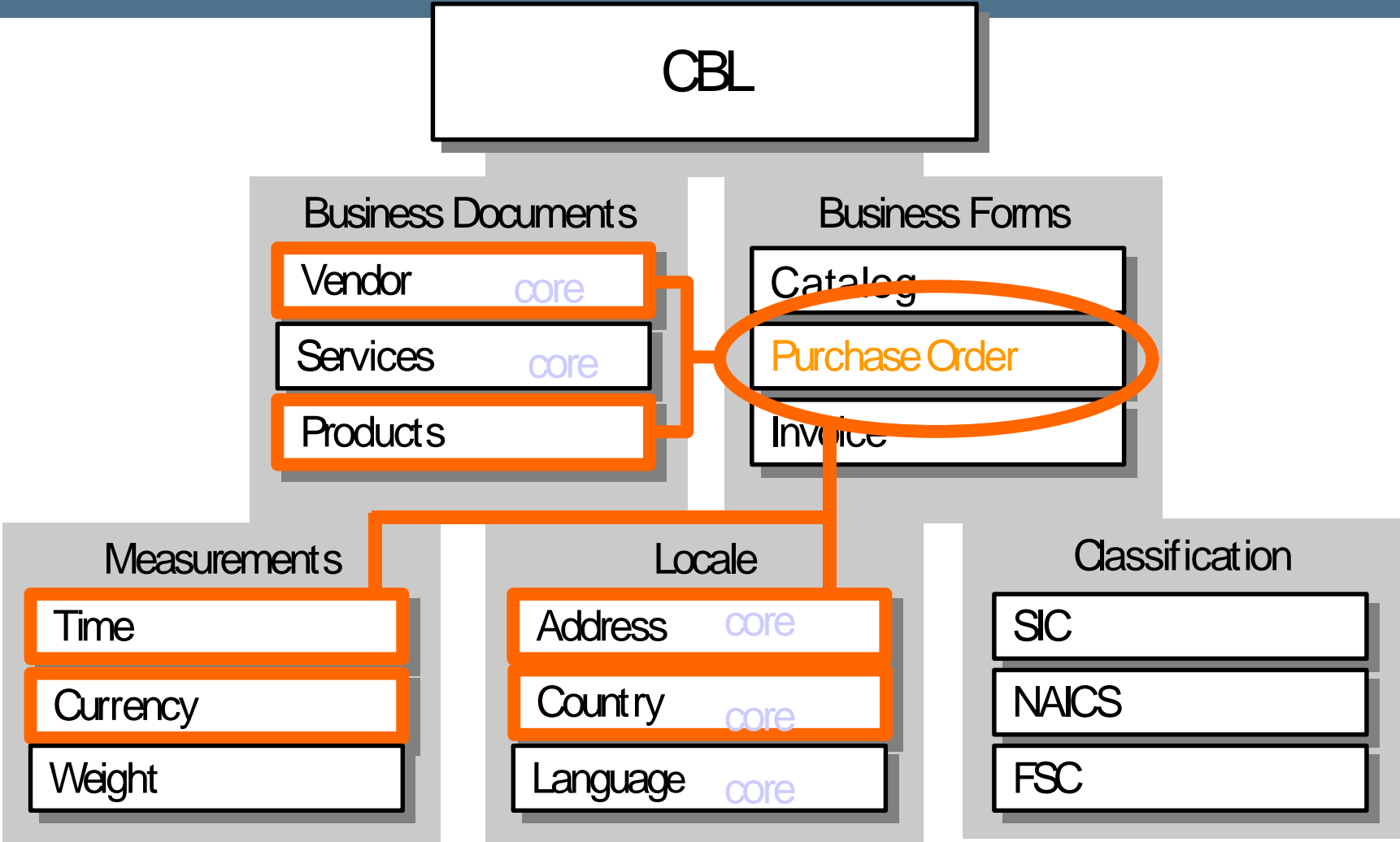
Customization with Interoperability

CBL Documents

FedEx Airbill

Business Descriptions

Vendor	core
Services	core
Products	

Business Forms

| Catalog |
| Purchase Order |
| Invoice |

Measurements

| Time |
| Currency |
| Weight |

Locale

Address	core
Country	core
Language	core

Classification

| SIC |
| NAICS |
| FSC |

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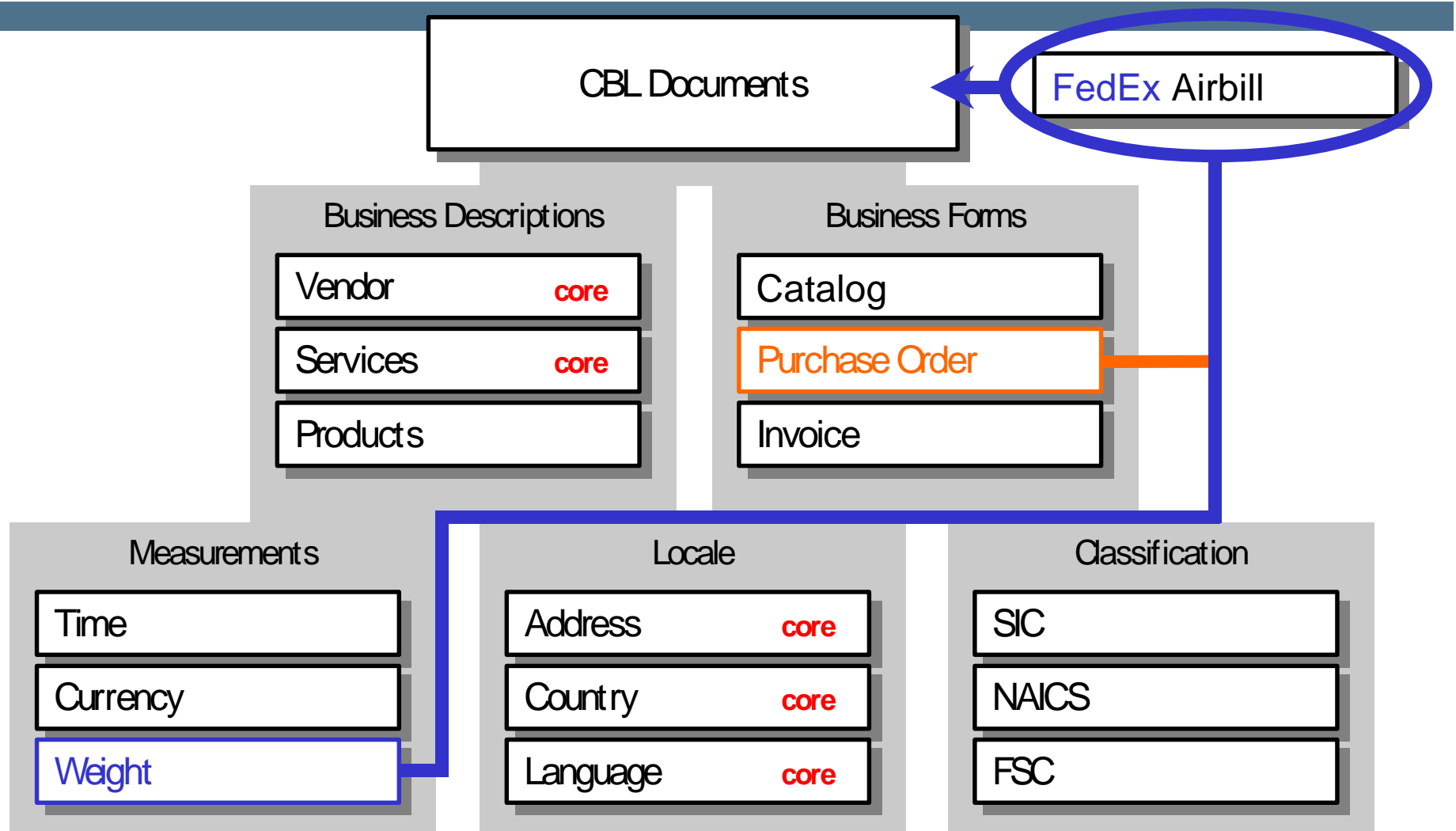
CBL Document Architecture for B 2 B

Market Registration

Company   Name
             Address
Agent   Name
             Title
Role   Buyer

Purchase Order

Buyer   Name
             Address
Product   SKU Number
             Manufacturer
             Model
Order   Quantity
             Price
Payment   Method
             Account Number

Catalog Description

SKU Number   10023
Product Type   Laptop
Manufacturer   IBM
Model   ThinkPad 560
Speed   166MHz
List Price $3500.00

Wallet

Card 1   American Express
            123-234-4444
Card 2   Visa
            001-234-5678

ERP Query

SKU Number   46747456
In Stock   6
Customer Price $1500.00

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Common Business Library Status

- CBL v1.1 contains several dozen DTDs and modules

  - can be freely downloaded from www.veosystems.com

- CBL has been deployed in several pilots

  - Project Seitai, GSA catalog interoperability

- CBL submitted to CommerceNet's eCo Working Group to seed a public XML repository

  - HP, Intel, IBM, Microsoft, Netscape, Sun, (~20 others)

  - Senior architects from leading standards initiatives including OBI, OTP, RosettaNet, XFDL, ICE, and XML-EDI

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Plug and Play Commerce - Veo Systems' Technology

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Veo Systems' Plug and Play Commerce

- All Web commerce sites and services are treated as reusable components whose interfaces are expressed as documents

- These "market participants" interoperate because they share a common semantic framework based on the open Common Business Library

- They can be linked to create virtual companies, markets, and trading communities

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"Loose Coupling" via Shared Document Models

- Business systems and services are integrated via the documents they exchange rather than via their application interfaces

- Shared document definitions provide an intuitive framework for specifying the business logic and computations that take place on each end of the exchange.

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Businesses are collection of services

Customer Registration

Vendor Establishment

Proposal

Product Information

Pricing

Purchasing

Invoicing

Inventory

Parts Ordering

Contracting

Credit Authorization

Shipping

Tracking

Order Status Reporting

Receipt Confirmation

Many, many, more ...

Documents are input/ outputs of services
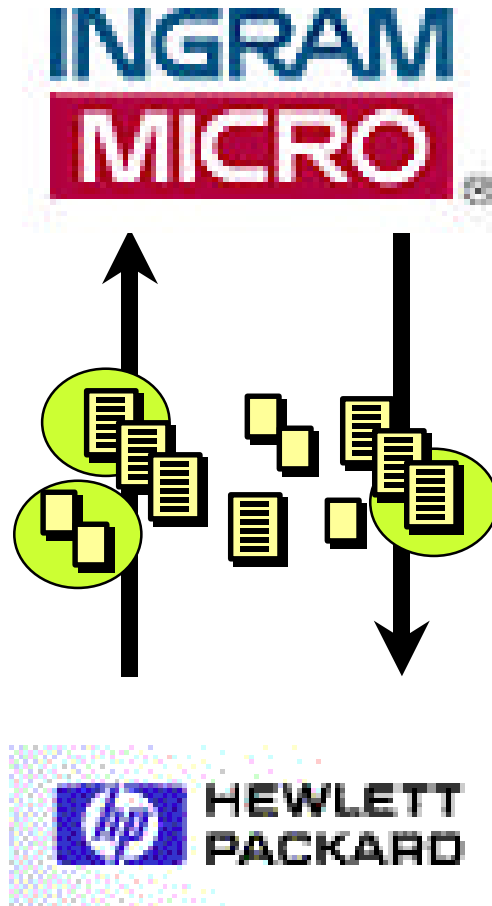
Customer Profiles

Vendor Profiles

Catalogs

Datasheets

Price Lists

Purchase Orders

Invoices

Inventory Reports

INGRAM MICRO

HEWLETT PACKARD

Bill of Materials

Contracts

Credit Reports

Shipping Reports

Tracking Reports

Order Status Reports

Receipts

Many, many, more ...

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"Loose Coupling" via Shared Document Models

- Five shared document definitions are implied in these two business rules:

  - if you send me a **request** for a catalog, I will send you a **catalog**

  - if you send me a **purchase order** and I can fulfill it, I will send you a **shipping notice** and an **invoice**

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Business Services Described Using CBL

```
< service>
        < service.name>  ...
        < service.location>  ...
        < service.op>
                < service.op.name>  ...
                <service.op.inputdoc>...
                <service.op.outputdoc>...
        </service.op>
        ...
</service>
```

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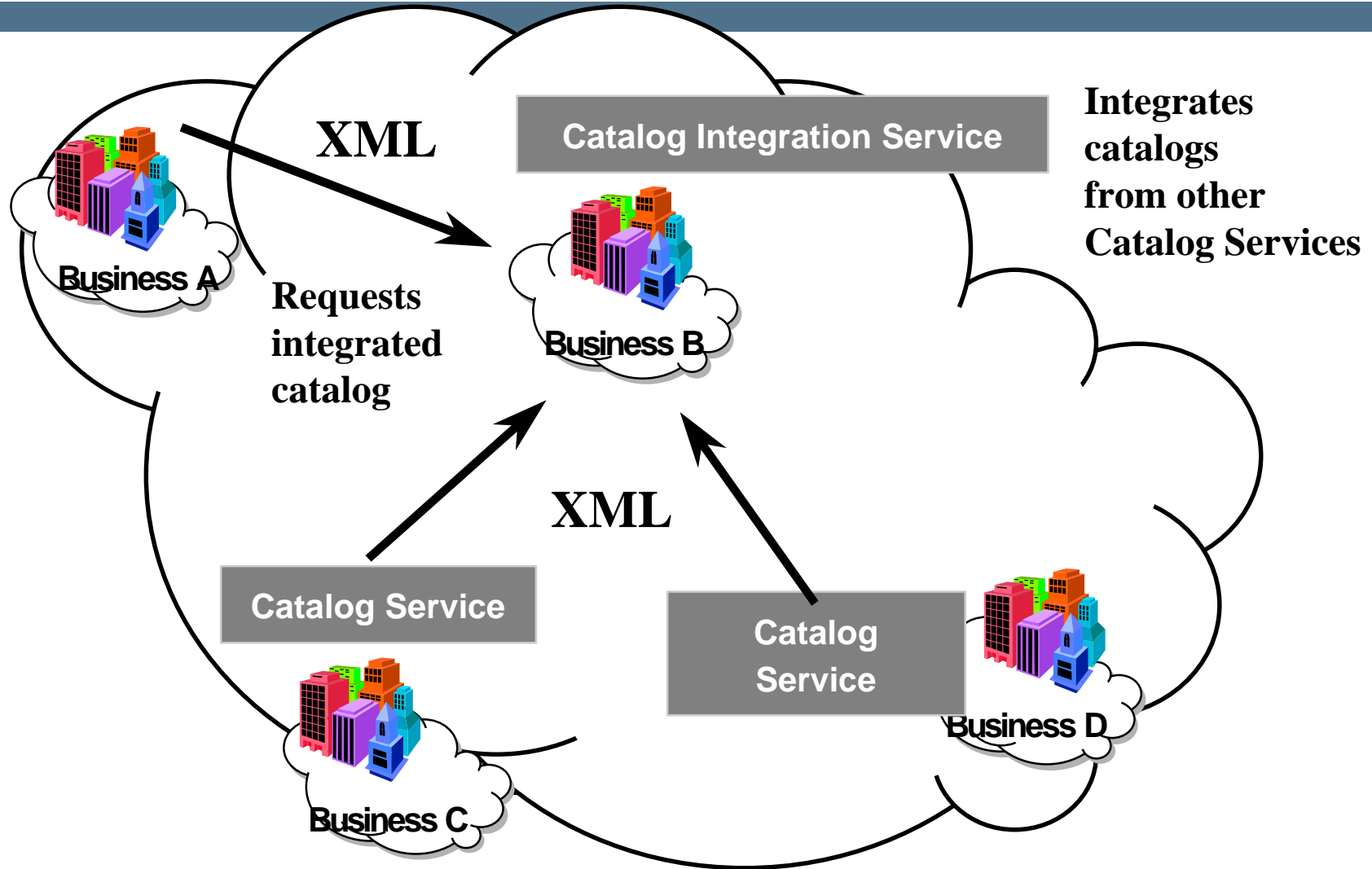# Business Services Described Using CBL

```
<  service>
  <  service.name>  Order Service<  /service.name>
  <service.location>www.veosystems.com/order
    <service.location>

    <service.op>
       <service.op.name>Submit Order</service.op.name>
       <service.op.inputdoc>po.dtd</service.op.inputdoc>
       <service.op.outputdoc>poack.dtd
         </service.op.outputdoc>
    </service.op>

  <service.name>Track Order</service.name>...
</service>
```
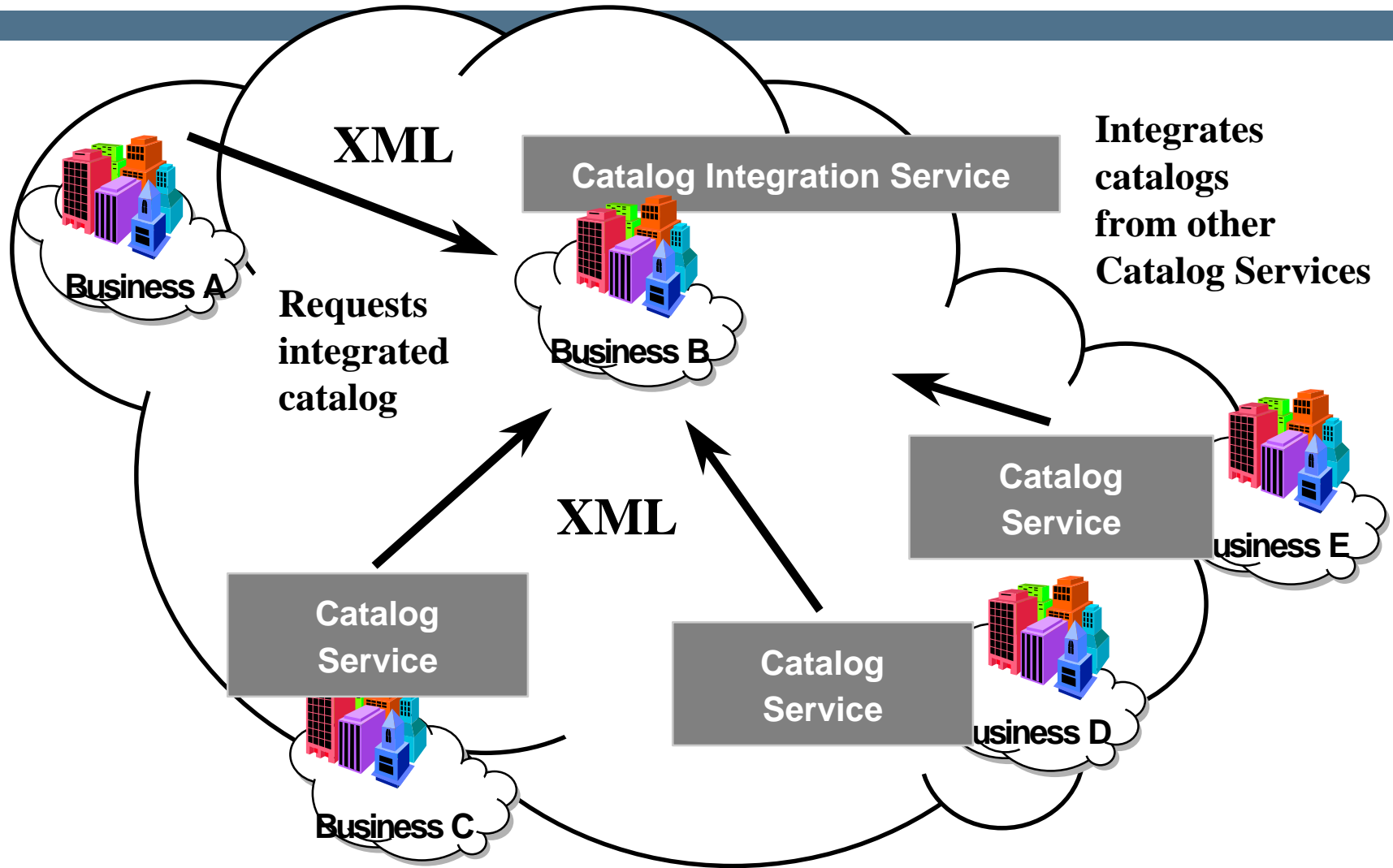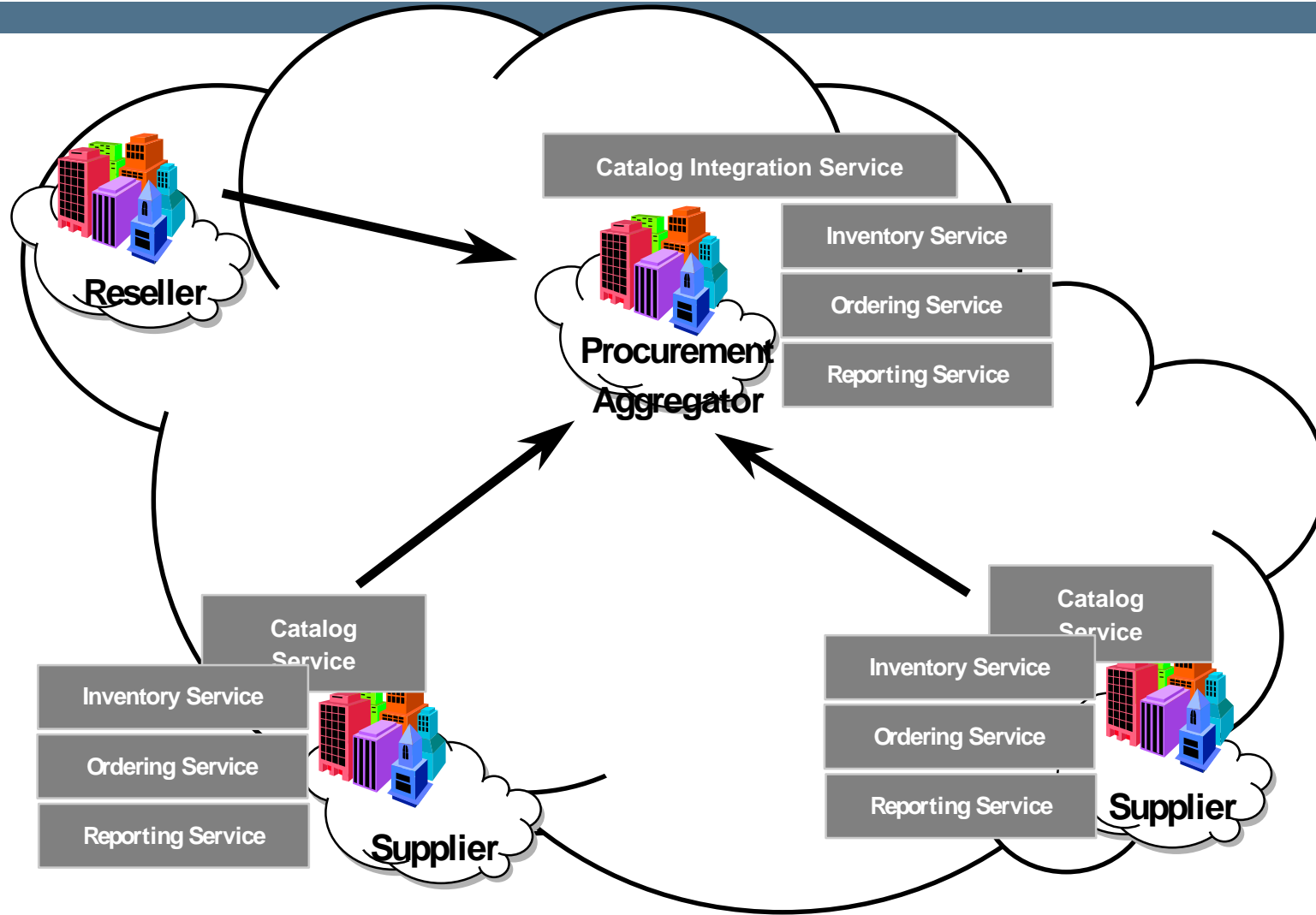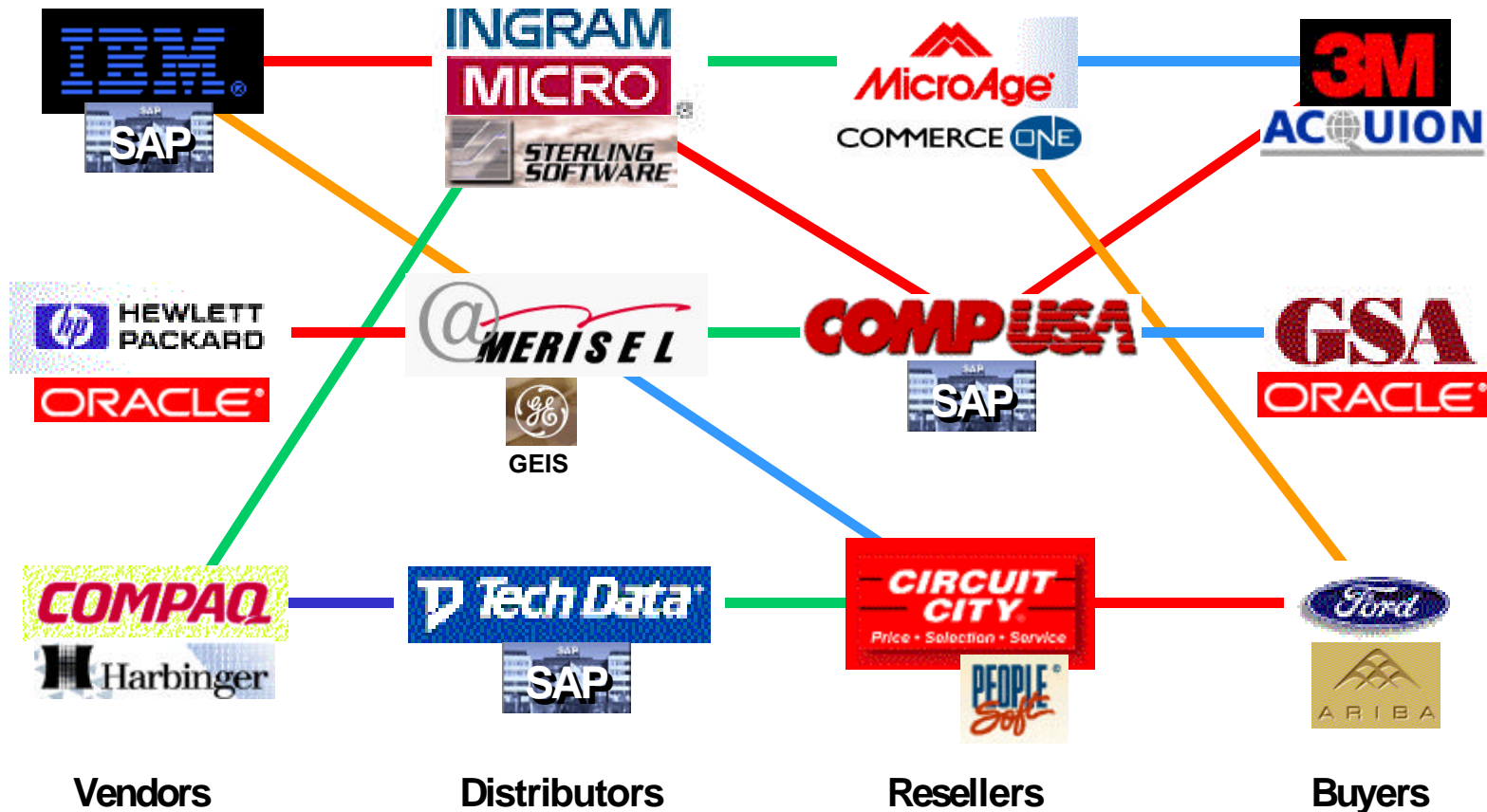
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Businesses Interact Through the Services They Offer and Consume

XML

Catalog Integration Service

Integrates catalogs from other Catalog Services

Business A

Business B

Requests integrated catalog

XML

Catalog Service

Catalog Service

Business C

Business D

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Makes It Possible to Have "Plug and Play" Businesses and Commerce

Business A

XML

Business B

Catalog Integration Service

Integrates catalogs from other Catalog Services

Requests integrated catalog

XML

Catalog Service

Business C

Catalog Service

Business D

Catalog Service

Business E

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Adding Services Incrementally

Supply Mess: Ad Hoc Integration

Vendors **Distributors** **Resellers** **Buyers**

Supply Web: Exchange of XML Documents

Vendor   Distributor   Reseller   Customer
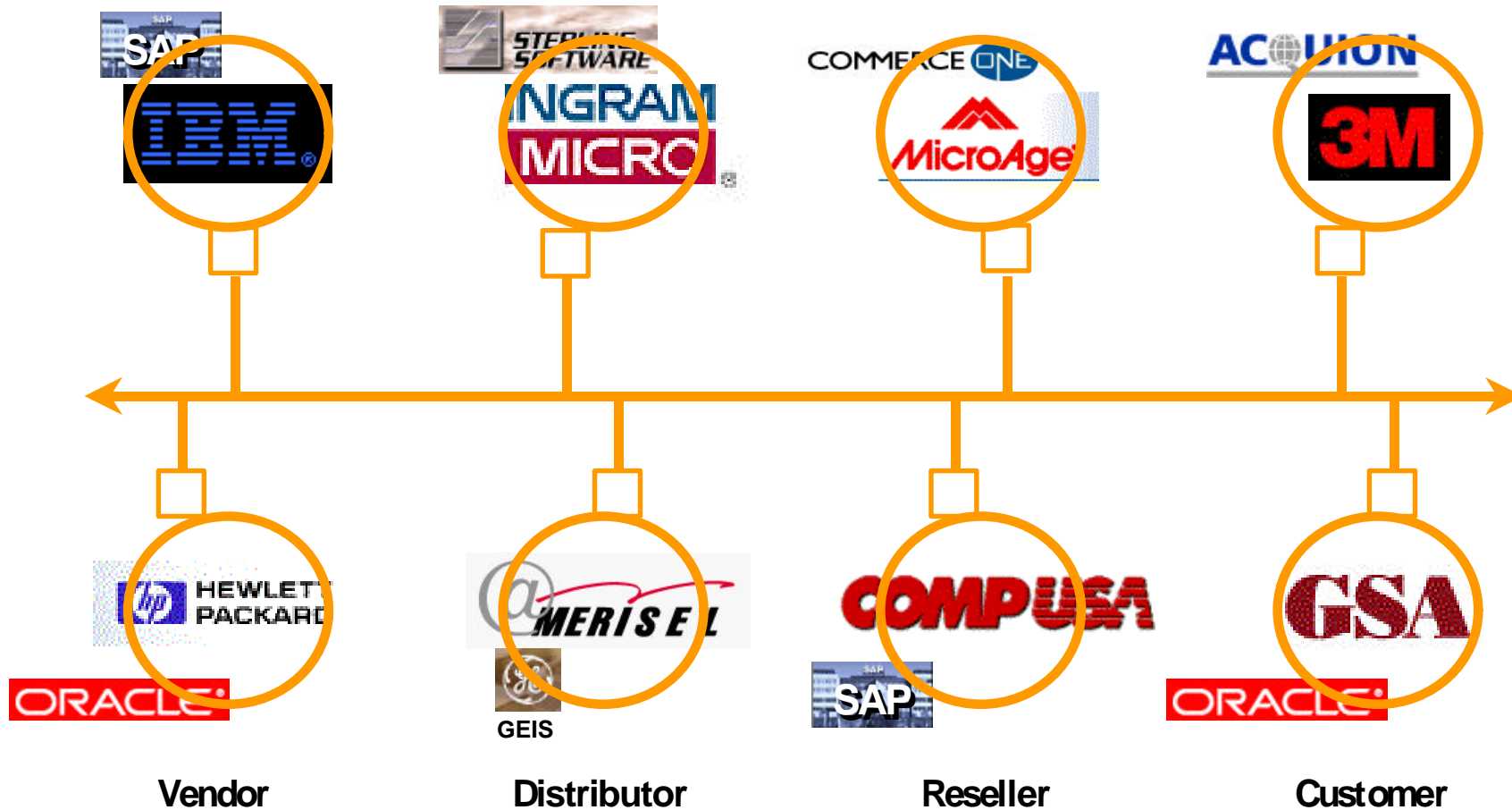
XML Enables Plug and Play Commerce

- XML is the key breakthrough that makes the Web "smart enough" to be used by programs instead of just "by eyes"

- Internet commerce will scale qualitatively when businesses publish rich and interoperable schemas for product catalogs and service descriptions

- Loose coupling via shared document definitions in service interfaces is the key to scalable integration

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"Untangling the Web"

25 April 1998

.."But the biggest role that XML is expected to play is in integrating the way that existing paper documents -- invoices, loan applications, contracts, insurance claims, you name it are exchanged between organizations around the world. Imagine what the world would be like if one company's computer system could automatically read any other organization's documents - and make complete sense of them? This is the goal that the technique known as EDI has struggled, unsuccessfully, to achieve for years. Though efforts have barely begun, there is a chance that XML could actually make that happen. If it did, business on the Web could run riot."