Business Process Management

Lessons Learned…
While Helping Our Customers…
Deliver Systems that
Optimize their Business Processes

Business Process Management Agenda

- Broad perspective of Business Process Management
- Architecture, processes and development platform that make it happen
- Technical demonstration
- Accomplishments with our client account
- Lessons learned
- Future delivery to other accounts

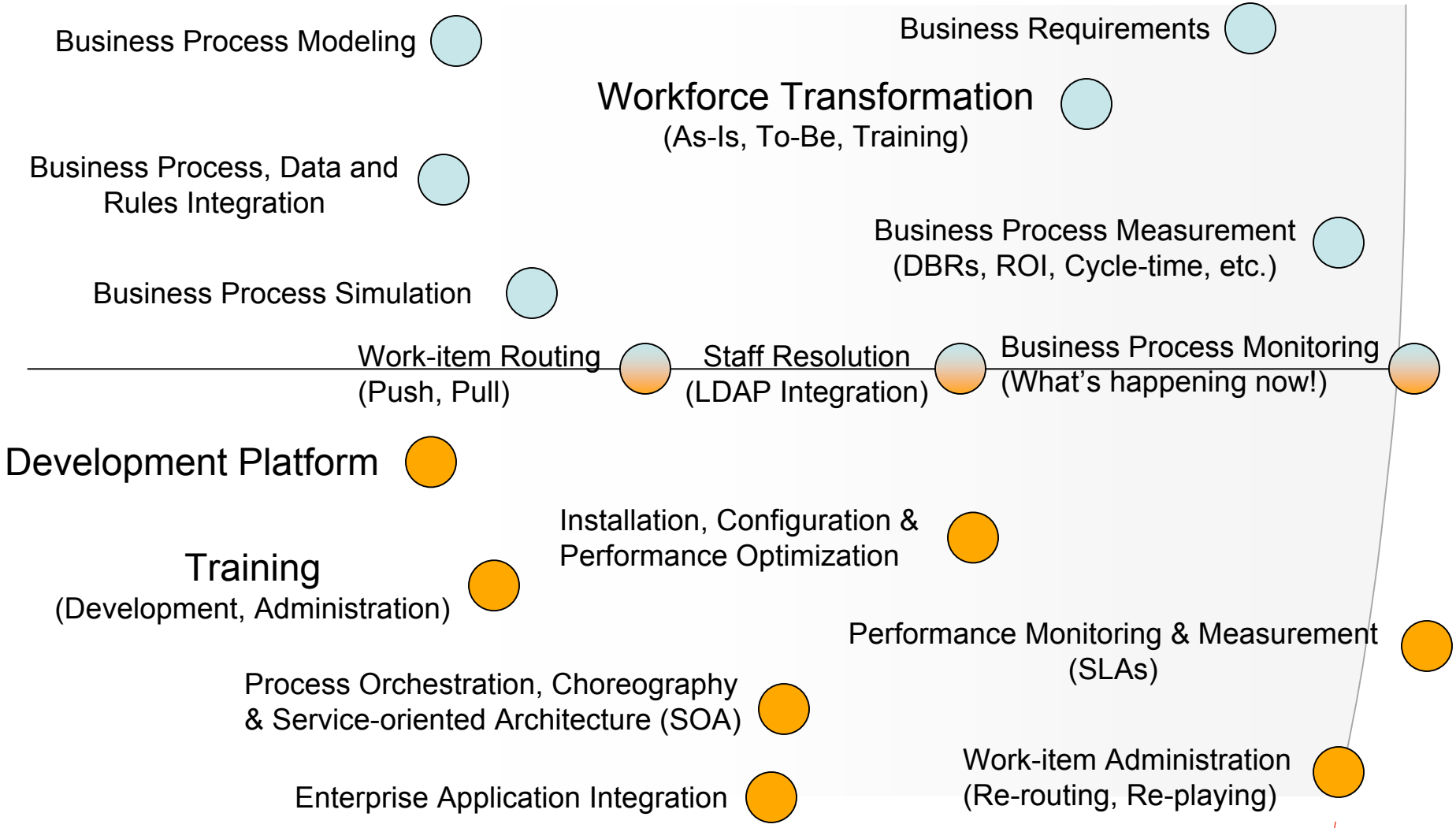
Business Drives New Challenges

- Interface and coordination problems between business functions
- Poor internal financial and quality controls, AKA “leakage”
- Public compliance gaps, inconsistencies and poor visibility
- Greater need for business performance: fulfillment cycle times, lead times, cost controls
- Redundant systems, recurring O&M costs
- Financial, time and opportunity costs of integrating systems and the consequences that breakage incurs

BPM Perspective

- Terms
- Standards
- Process
- Architecture
- Platforms

Business Process Management Realm



Business Process Improvement Cycle

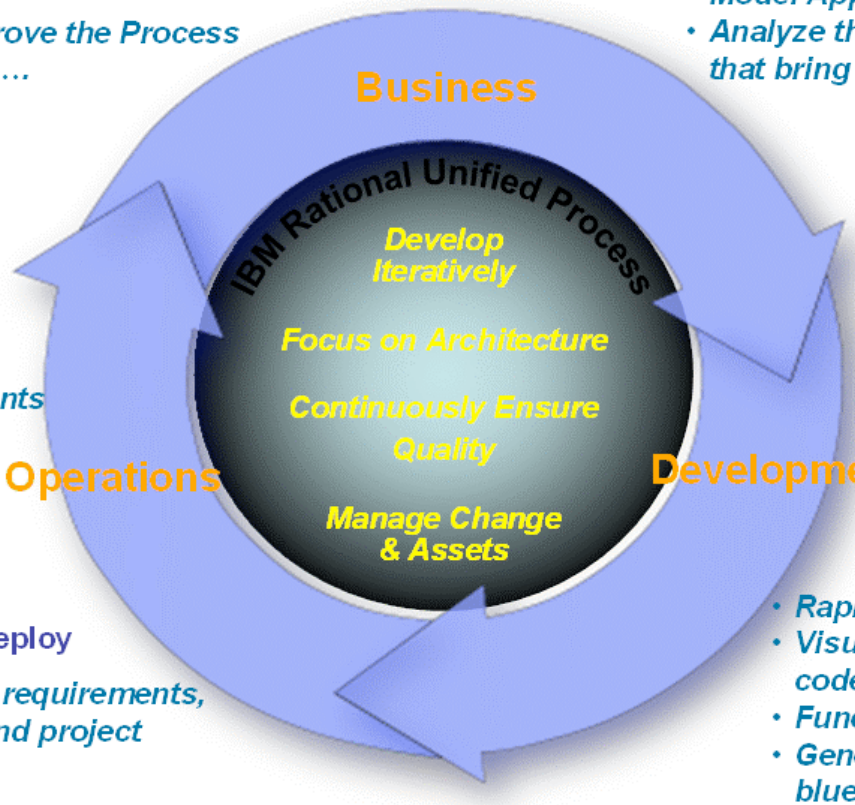
NUMBERSIX

Model Business Process

- *Document and specify As-Is Process with Metrics*
- *Specify and construct goals, objectives and requirements*
- *Apply Technology to Improve the Process*
- *Model the To-Be Process….*

Understand Business & Elicit Requirements

- *Model and simulate business processes*
- *Model Applications and Data*
- *Analyze the financials & prioritize the areas that bring maximum business value*



Monitor & Manage

- *Audit processes and improvements*
- *Make Iterative Improvements*
- *Model the Next As-Is and To-Be Process….*

Discover & Design

- *Harvest existing assets*
- *Identify / prepare existing assets or reuse*
- *Design system architecture*

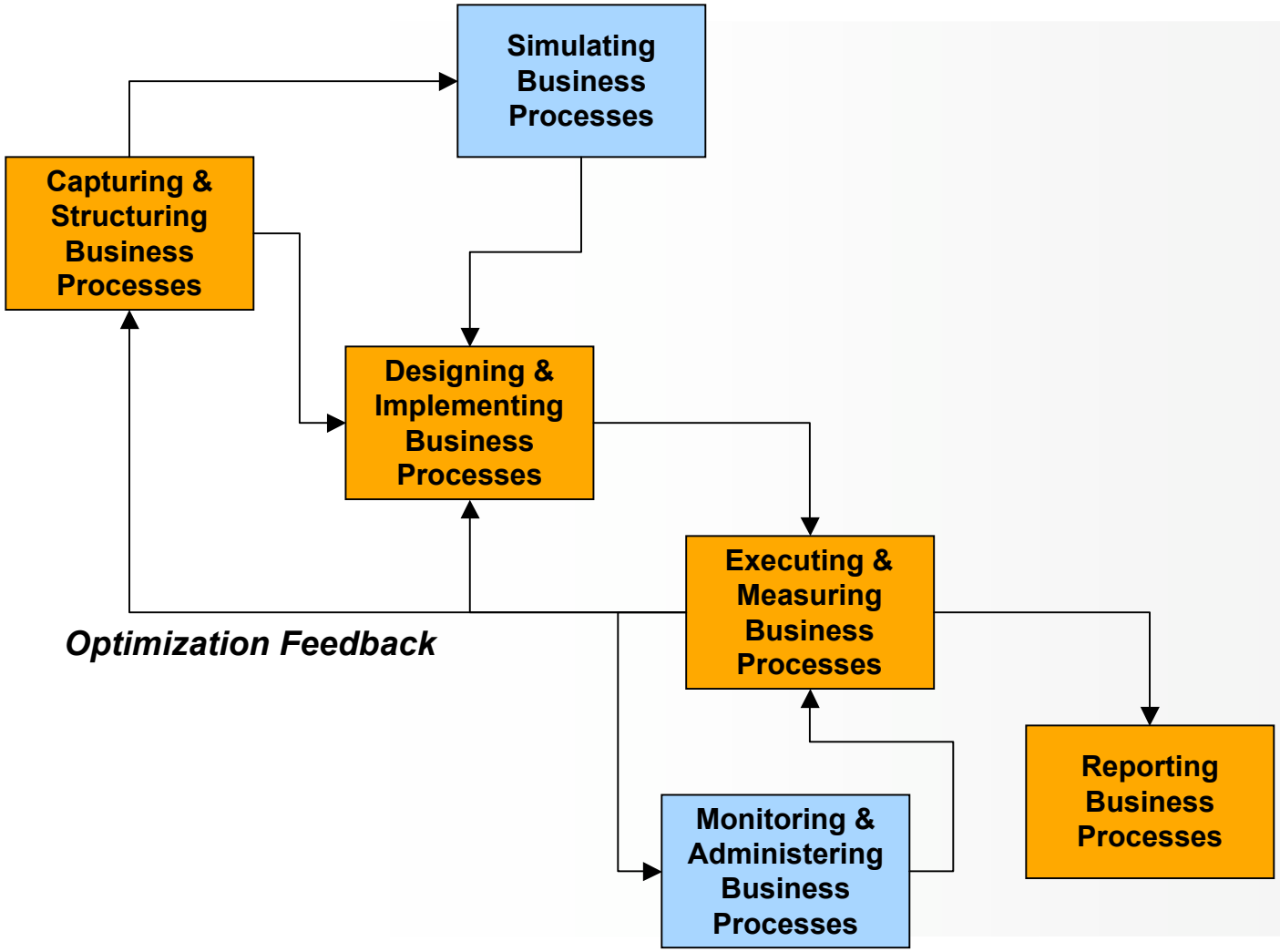
Test & Deploy

- *Manage testing, requirements, configuration, and project management*

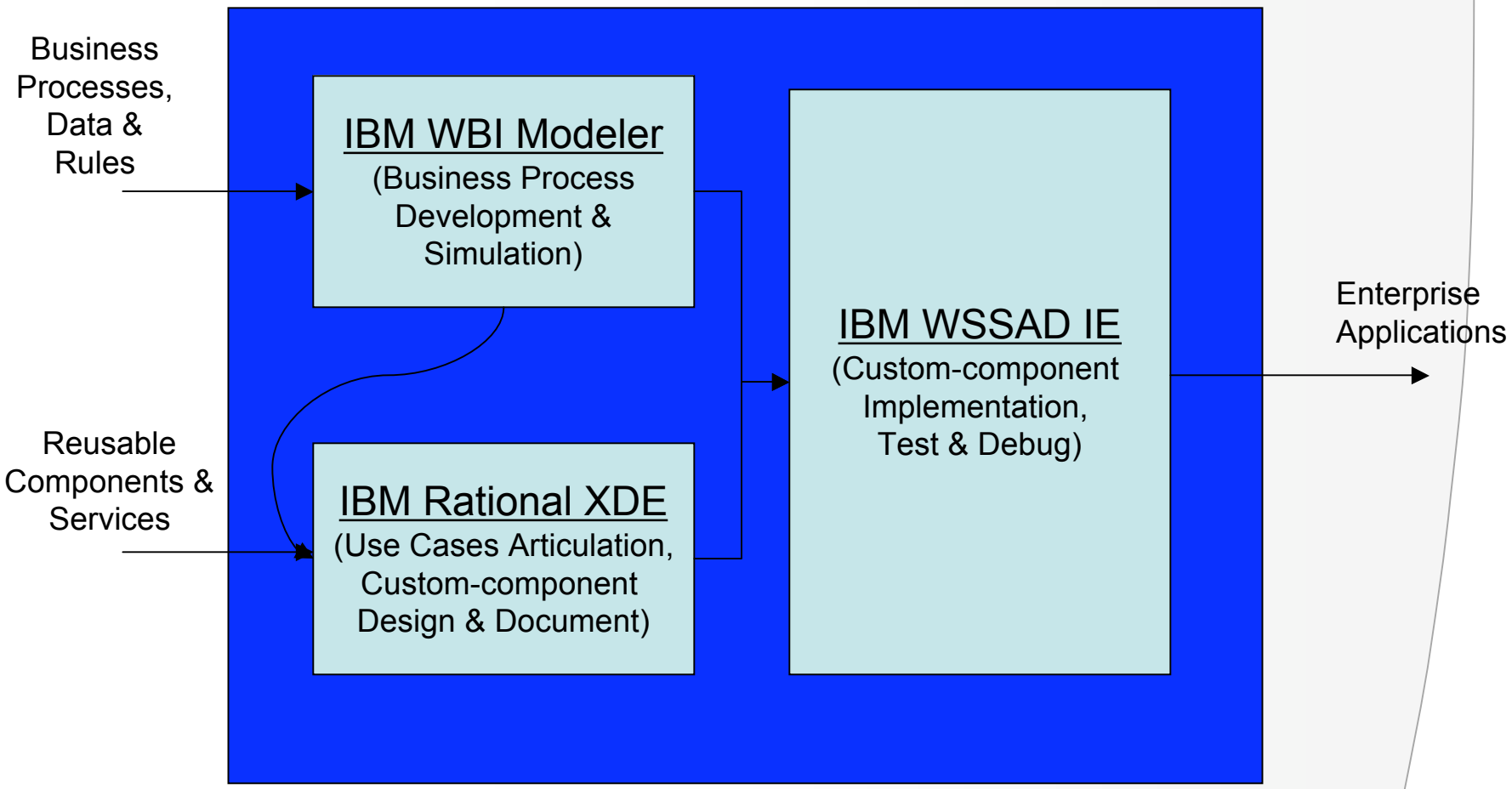
Transform, Integrate & Build

- *Rapid integration and/or app development*
- *Visual construction and programmatic code generation*
- *Functional and load testing*
- *Generate XML code & manage UML blueprints & Automated Workflow*
- *Apply Patterns to Accelerate Development*

Business Process Development Lifecycle



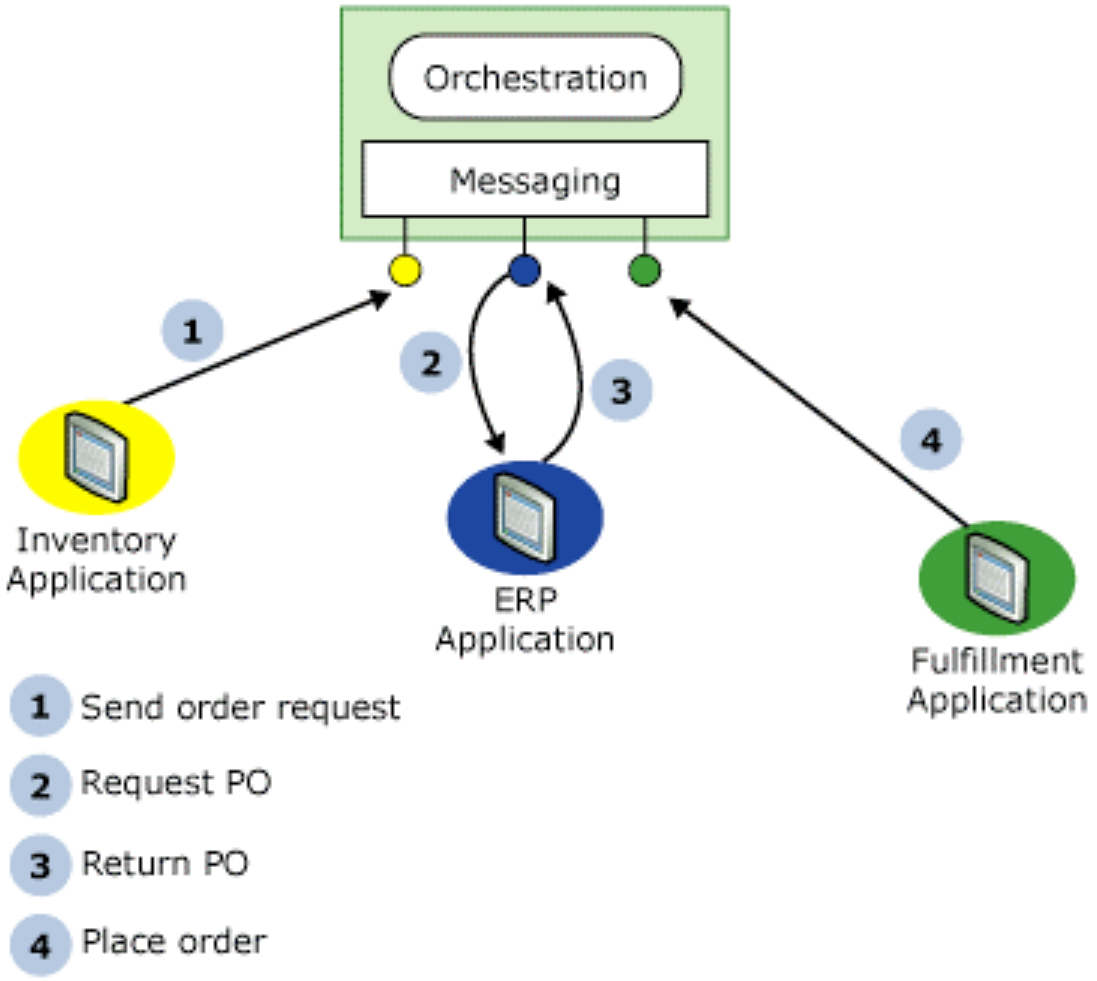
IBM/Rational Development Platform



Real Business Processes Seldom Simple

- Accesses several applications
- Runs for hours, days, weeks
- Implements complex business rules
- Interacts with many different people
- BPM architectures leverage diverse range of infrastructure, technologies and tooling to make this productively happen

Generic Orchestration Example



Business Process Modeling Notation

- Graphical notation for capturing and expressing business processes
- Provides binding between notation and the constructs of block-structured process execution languages such as BPEL
- Representation for business analysts, technical implementers and those who manage and monitor business processes
- Becoming the standard BP modeling notation due to necessities of interoperability
  - Consolidation of UML, EDOC, IDEF, ebXML, BPSS, RosettaNet, LOVeM, Event-Process Chains, others

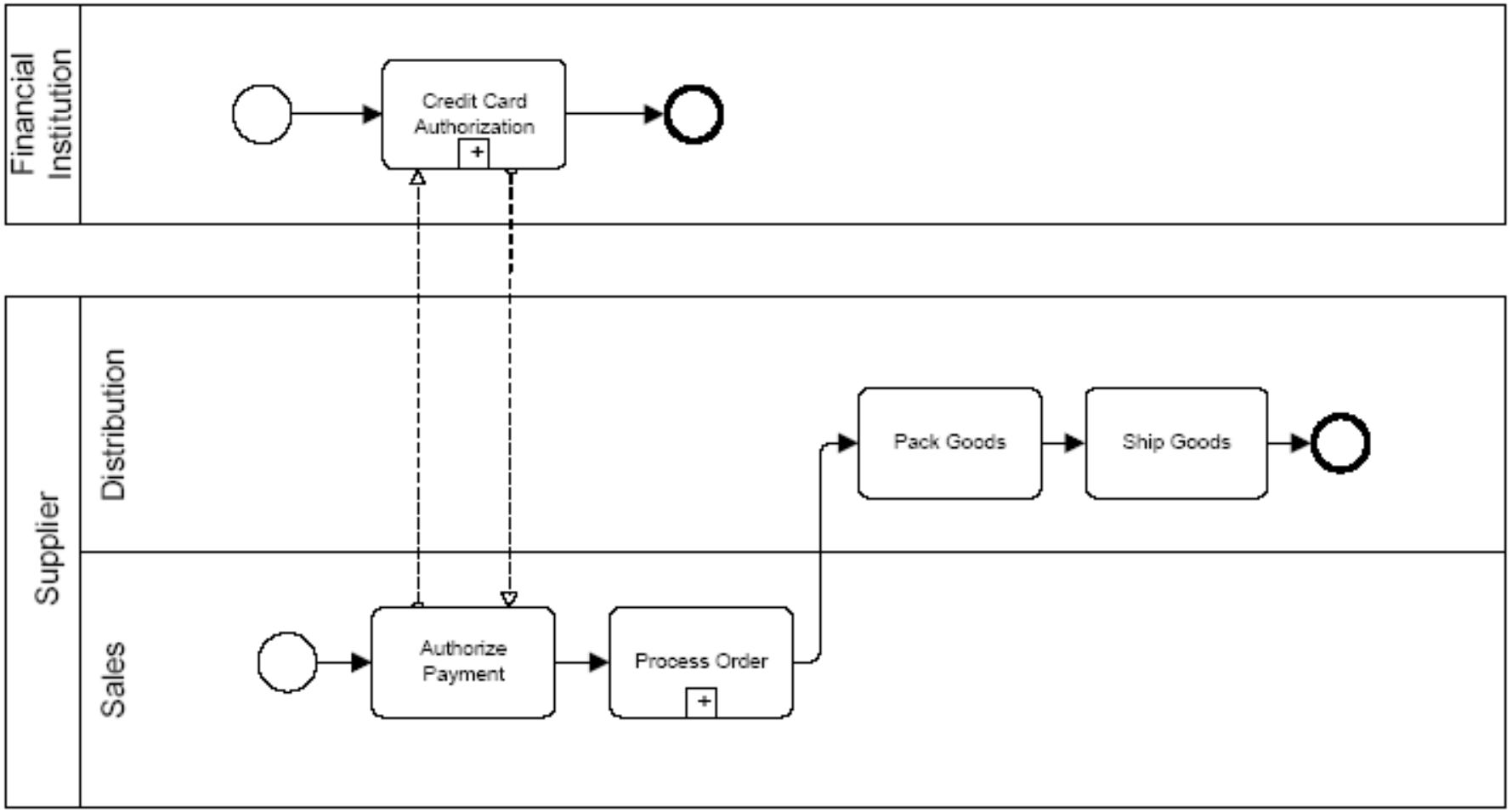
BPMN Elements

- Event
  - Something that happens during a business process, can be a trigger or result
- Activity
  - Representation of some work that is performed
- Gateway
  - Used to control divergence and convergence of sequence flow

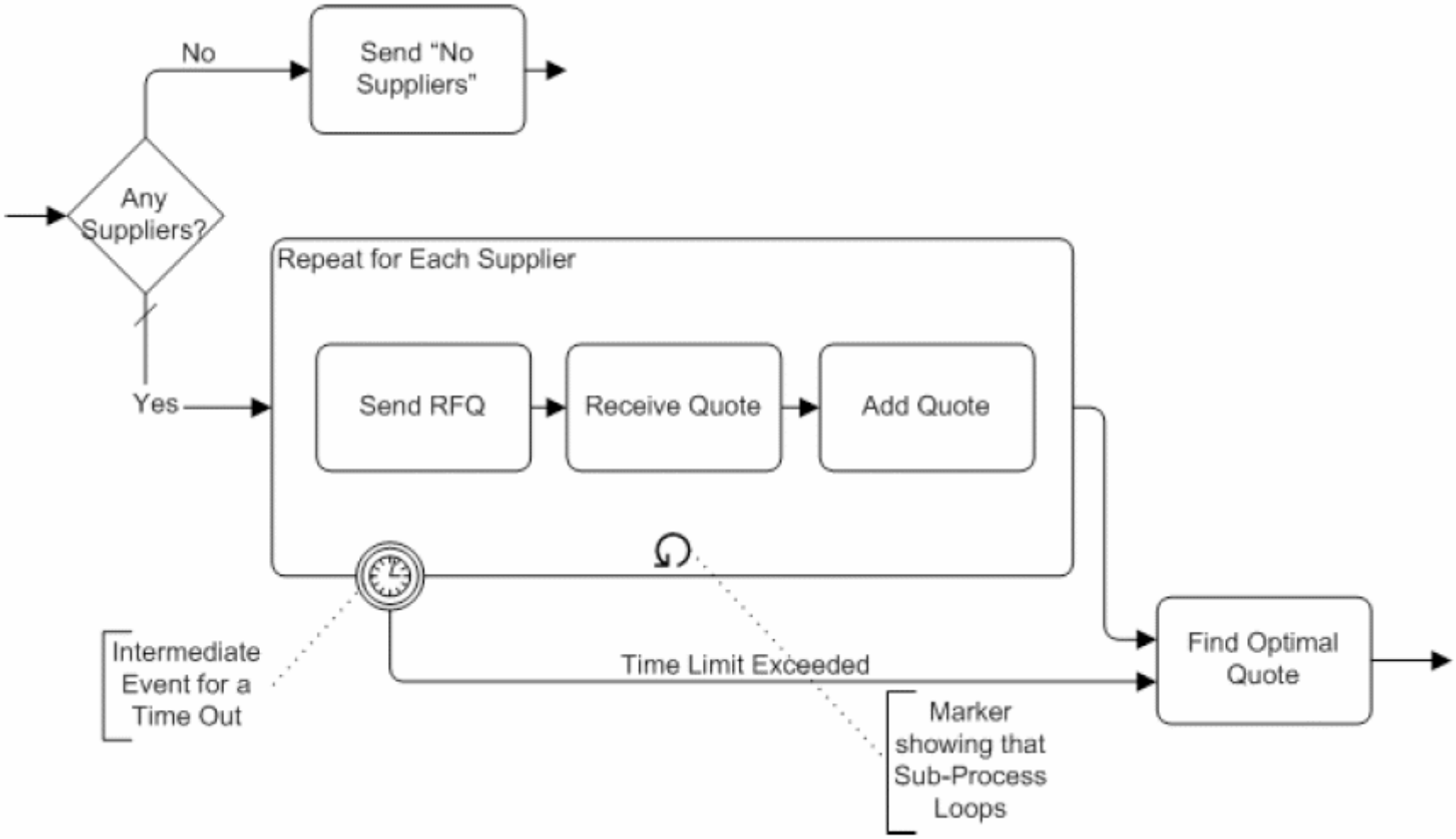
BPMN Elements

- Sequence Flow
  - Specification of the order of activities
- Message Flow
  - Flow of messages between process participants
- Association
  - Associates data, text, etc. to flows
- Pool
  - Representation of a participant in a process
- Lane
  - Sub-partition within a pool

BPMN Example



BPMN Sub-process Example



Business Process Execution Language

- Business Process Execution Language (BPEL), formerly Business Process Execution Language for Web Services (BPEL4WS), defines a notation for specifying business process behavior based on Web Services
- Business processes can be described in two ways:
  - Executable business processes model actual behavior of a participant in a business interaction
  - Business protocols, in contrast, use process descriptions that specify the mutually visible message exchange behavior of each of the parties involved in the protocol, without revealing their internal behavior. The process descriptions for business protocols are called abstract processes.
- BPEL used to model the behavior of both executable and abstract processes. The scope includes:
  - Sequencing of process activities, especially Web Service interactions
  - Correlation of messages and process instances
  - Recovery behavior in case of failures and exceptional conditions
  - Bilateral Web Service based relationships between process roles

Business Process Execution Language

- XML-based language for standardizing business processes in a distributed or grid computing environment that enables separate businesses to interconnect their applications and share data
- Designed as a combination of IBM's Web Services Flow Language and Microsoft's XLANG spec, platform-independent BPEL allows enterprises to keep internal business protocols separate from cross-enterprise protocols so that internal processes can be changed without affecting the exchange of data from enterprise to enterprise
- A BPEL document, for example, keeps track of all the business processes that are connected to a transaction and ensures that the processes are executed in the correct order through the automation of messages
- BPEL has built-in support for synchronous and asynchronous activities, XML manipulation, parallel processing, conditional branching, exception management, compensating transactions and non-structured events

BPEL Example

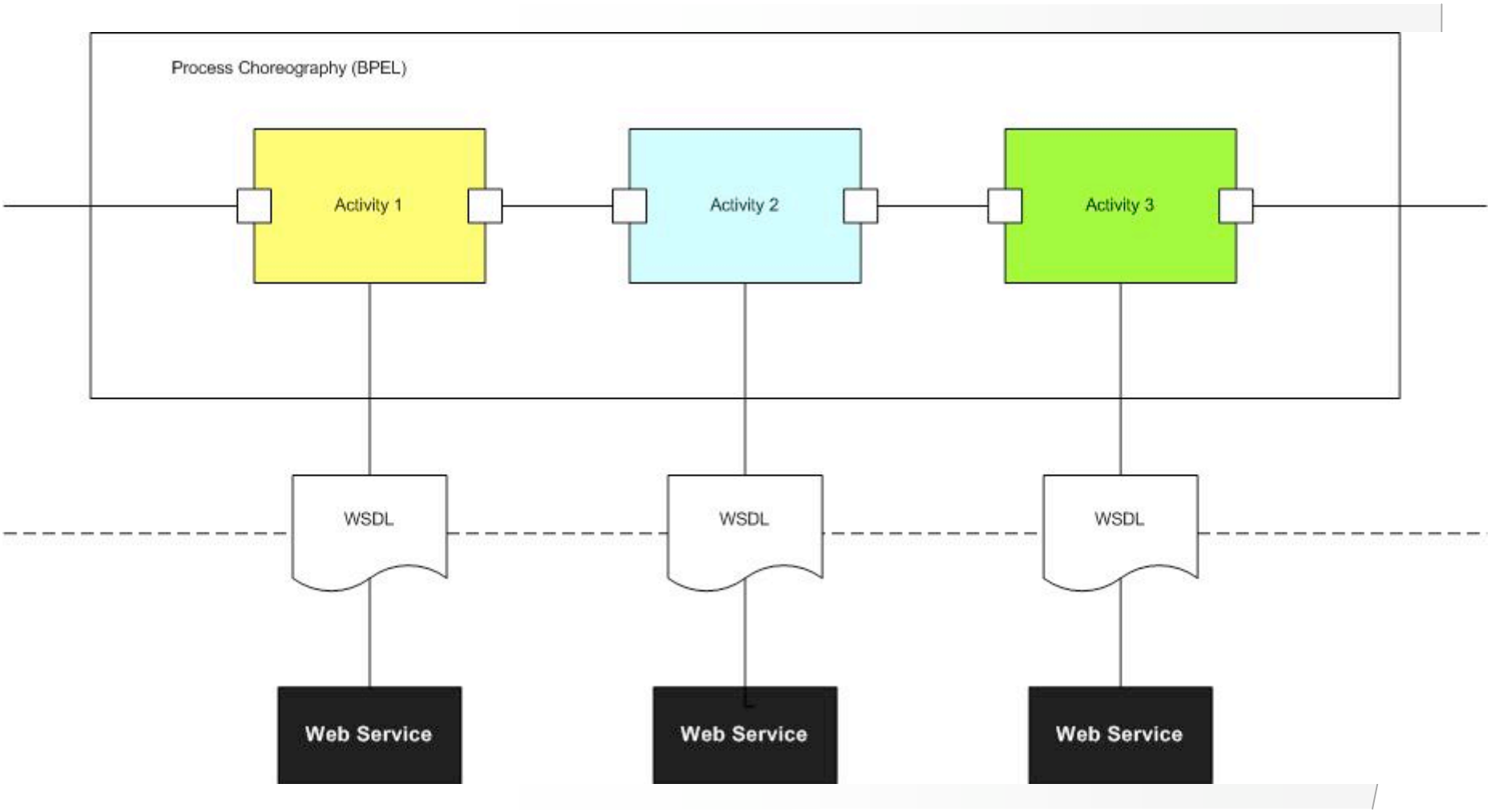
```
1  <process name="TravelBookingProcess"
             xmlns="http://schemas.xmlsoap.org/ws/2003/03/business-process/"
             xmlns:bpelp="http://www.ibm.com/websphere/v5.1/business-process/">
     <partnerLinks>
2      <bpelp:partnerLink name="traveler">
         <bpelp:myPortType name="TravelAgentPT"/>
         <bpelp:partnerPortType name="TravelerCallbackPT"/>
       </bpelp:partnerLink>
3      <bpelp:partnerLink name="airlineReservationSystem">
         <bpelp:partnerPortType name="FlightReservationPT"/>
       </bpelp:partnerLink>
       ...
     </partnerLinks>
     ...
4    <flow>
5      <links>...</links>

6      <receive partnerLink="traveller"
                portType="travel:TravelAgentPT" operation="book"
                createInstance="yes" .../>
       <assign>...</assign>
7      <invoke name="checkCustomer" partnerLink="internalServices"
               portType="CheckOperationsPT" operation="checkCustomer".../>
       <assign>...</assign>
8      <reply name="reply" partnerLink="traveller"
              portType="travel:TravelAgentPT" operation="book" .../>
       ...
9      <reply name="replyFault" partnerLink="traveller"
              portType="travel:TravelAgentPT"operation="book"
              faultName="failure" .../>
       ...
10     <while condition="getVariableData('currentLegIndex')  &lt;
                         getVariableData('input','flights','@noOfLegs')">
11       <invoke name="bookFlight" partnerLink="airlineReservationSystem"
                 portType="FlightReservationPT" operation="bookFlight" .../>
         <assign>...</assign>
       </while>
       ...
     </flow>
   </process>
```

Web Services Description Language

- WSDL is an XML format for describing network services as a set of endpoints operating on messages containing either document-oriented or procedure-oriented information
- Operations and messages are described abstractly, and then bound to a concrete network protocol and message format to define an endpoint
- Is extensible to allow description of endpoints and their messages regardless of what message formats or network protocols are used to communicate

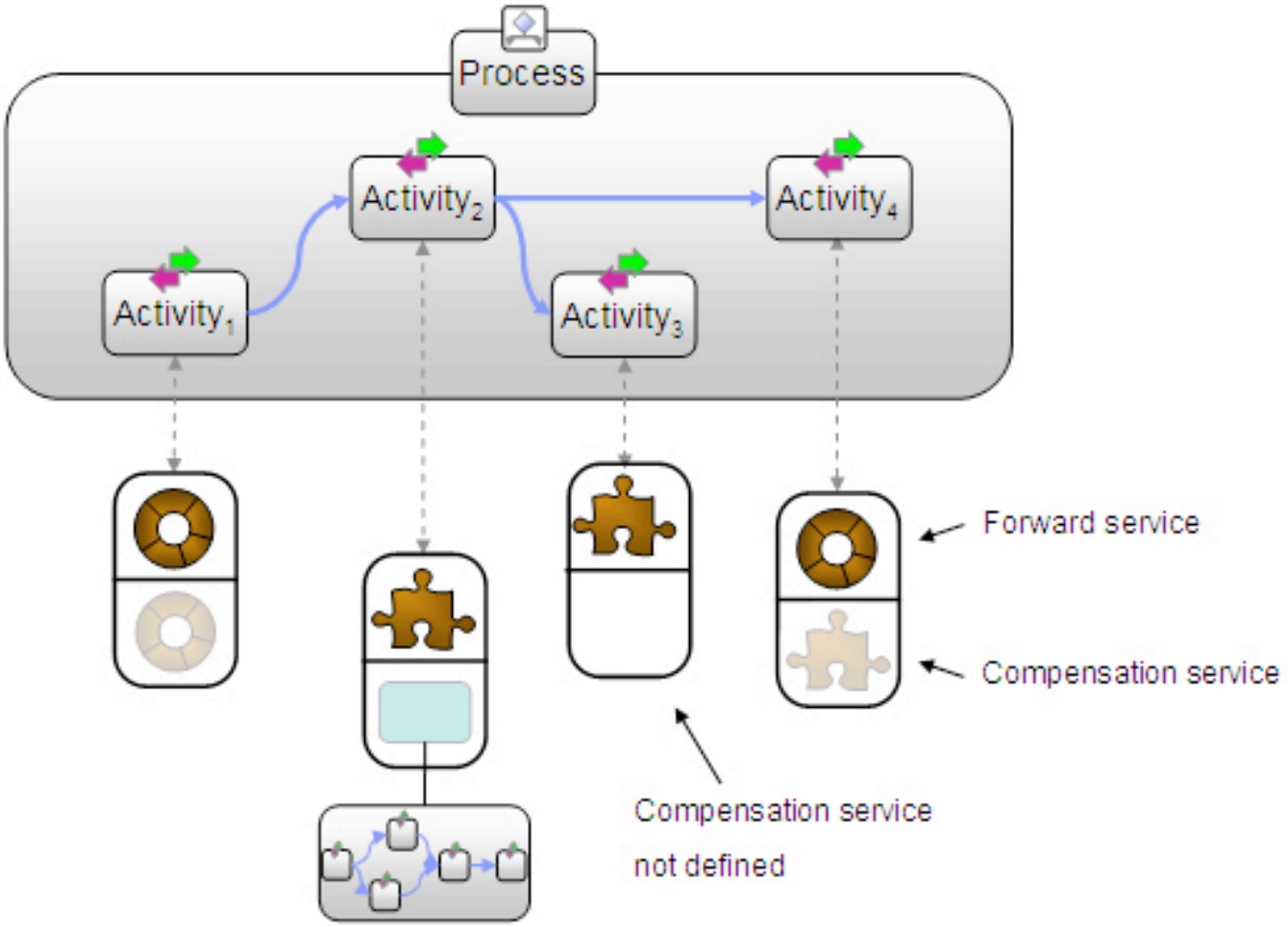
BPEL, WSDL Ingredients for Defining SOA



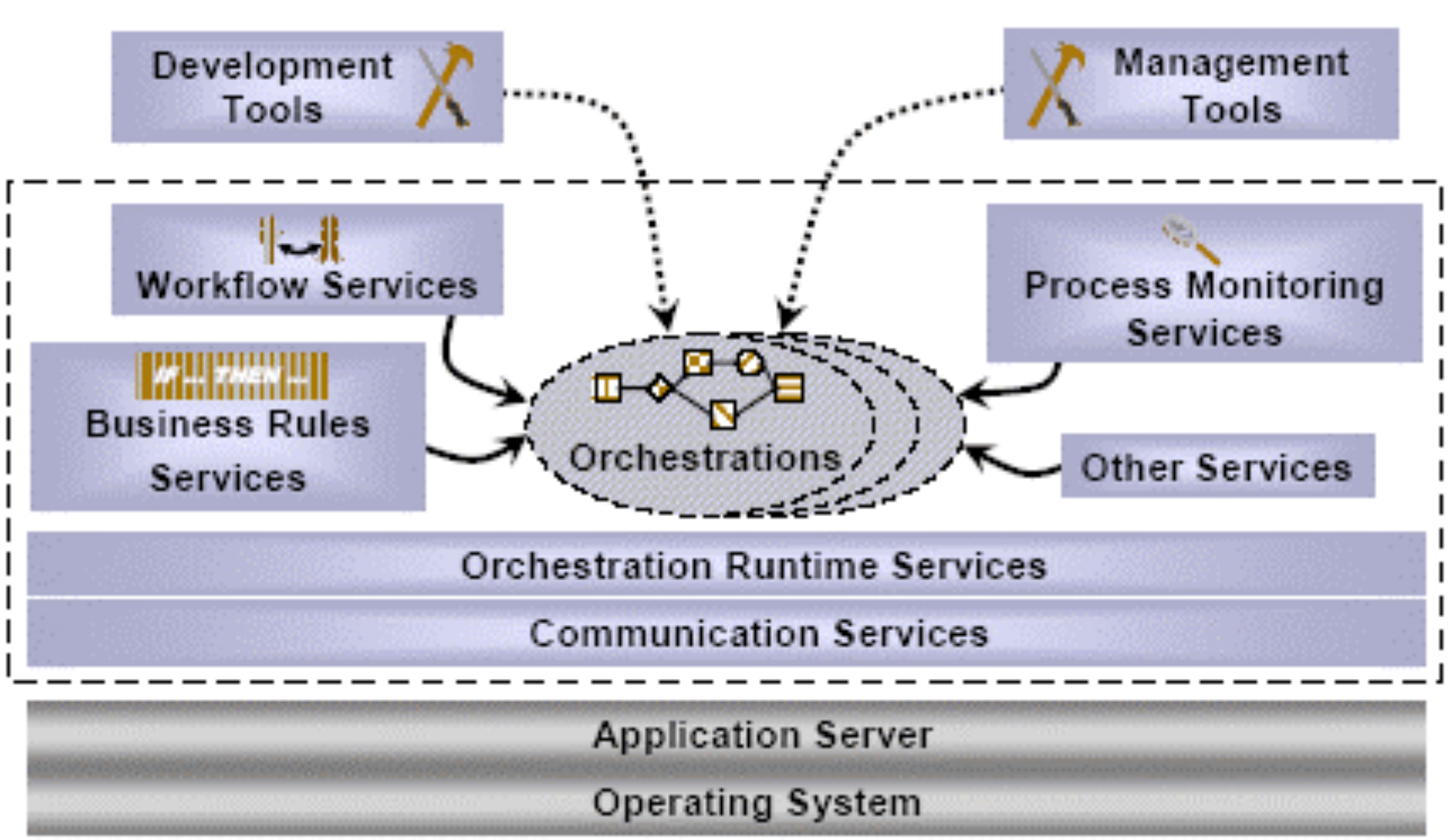
Compensation

- Long-running processes may execute over hours, days, months
  - Need more than roll-back since activity has already executed successfully
- During a business process
  - Service executes, completes and makes a durable change
  - Failure occurs during subsequent process
  - Recovery entails reversing one or more service invocations
- Keep compensation in mind when designing services

Process Choreography Web Services Integration



Basic BPM Architecture*

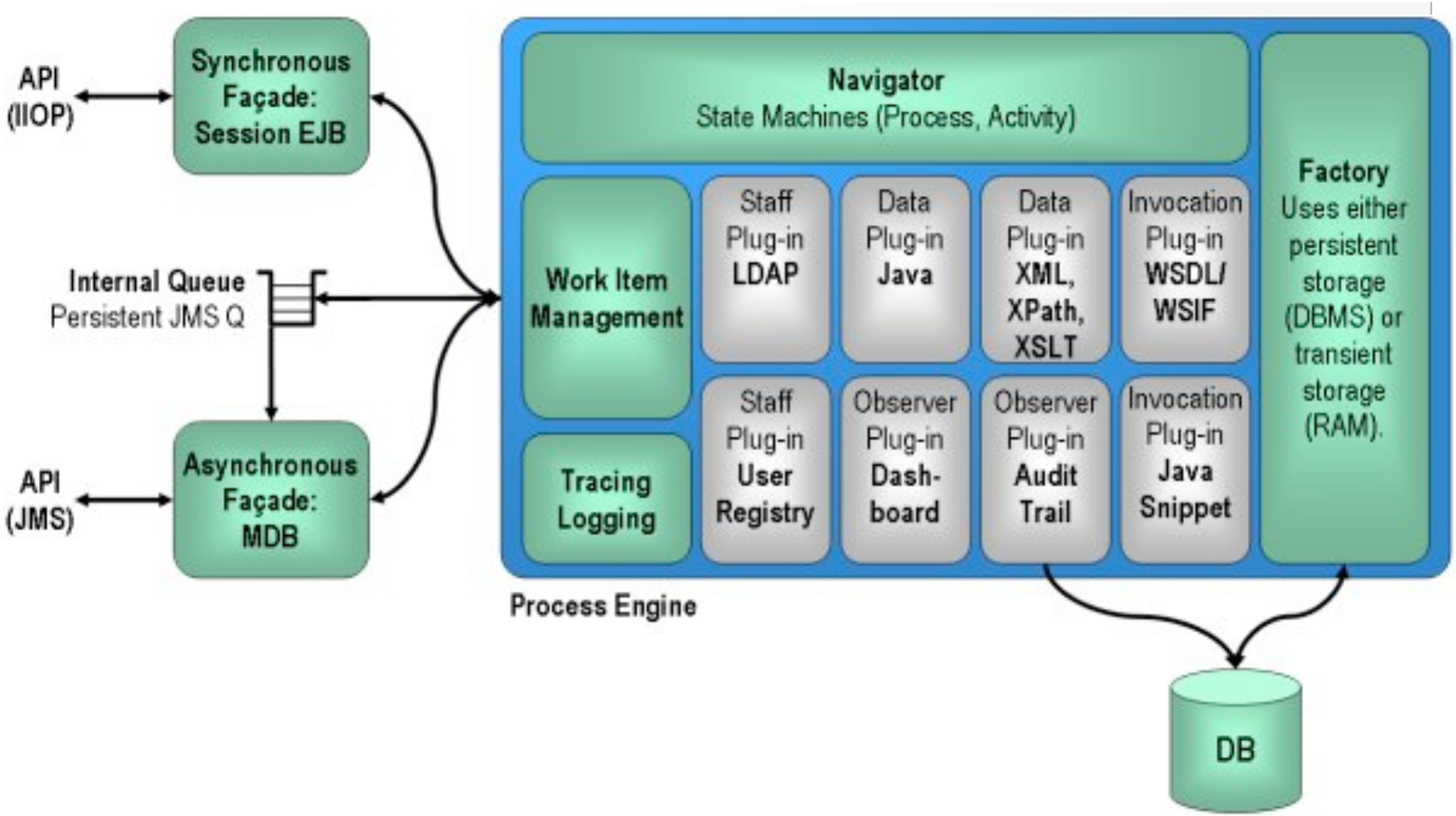


*"Understanding BPM Servers", David Chappell, October 2004

Enterprise BPE/Workflow Vendors

- Newer, large enterprise players
  - IBM WebSphere Process Choreographer
  - Oracle BPEL Process Manager
  - BEA WebLogic Integration
  - Microsoft BizTalk Server
- Older, niche players
  - PegaSystems
  - TIBCO
  - Insessions

WPC Architecture



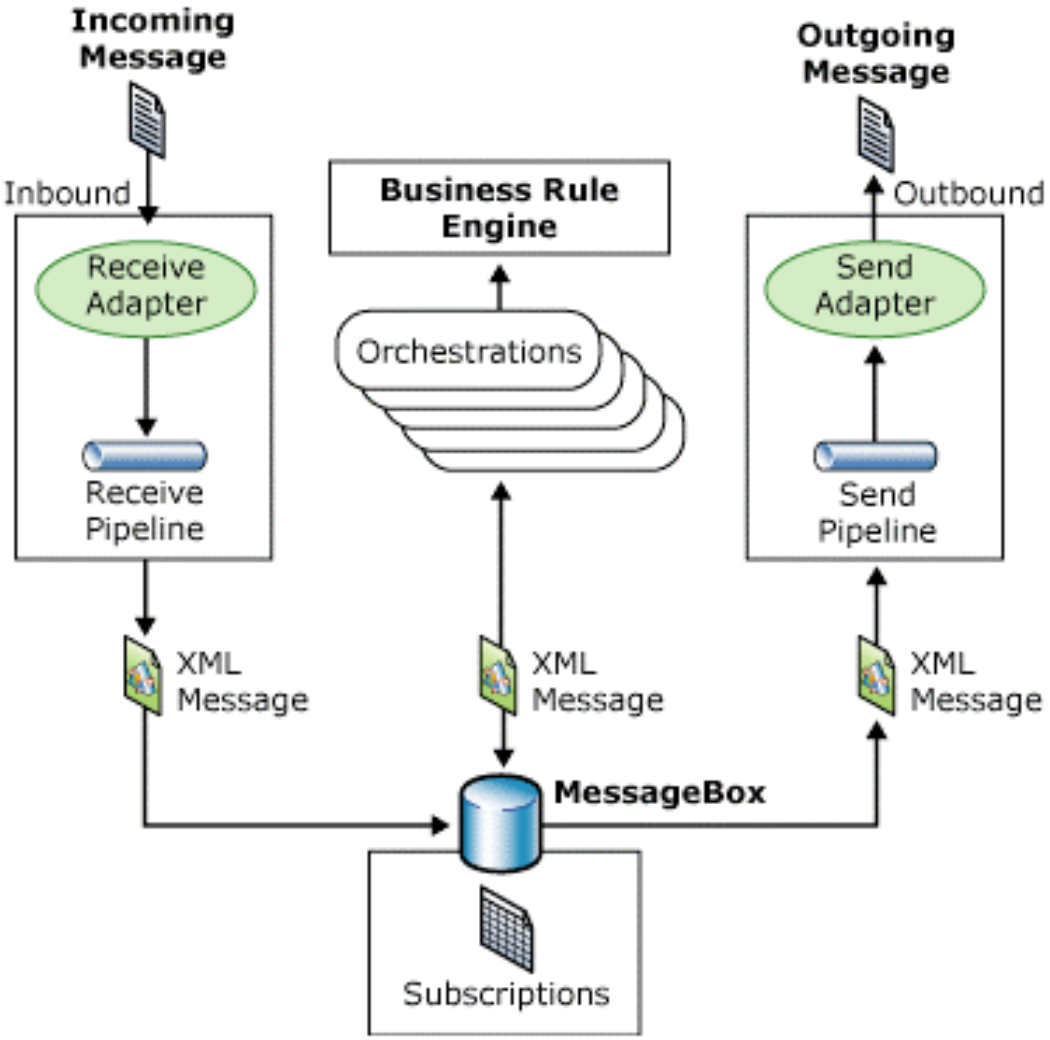
Universal Description, Discovery and Integration

- A registry or access point to locate web services
- Contains location and invocation metadata used for run-time execution
- UDDI specifies protocols for
  - Publishing and searching services registry
  - Controlling access to registry
  - Distributing and delegating to other registries
- Clients find, bind and execute web services

Web Services for Remote Portals (WSRP)

- Web services that handle only presentation-specific, user-interaction based protocols with portals and other applications
- User-facing web services

BizTalk Server Architecture*



*"Understanding BizTalk Server", Feb 2004, Microsoft

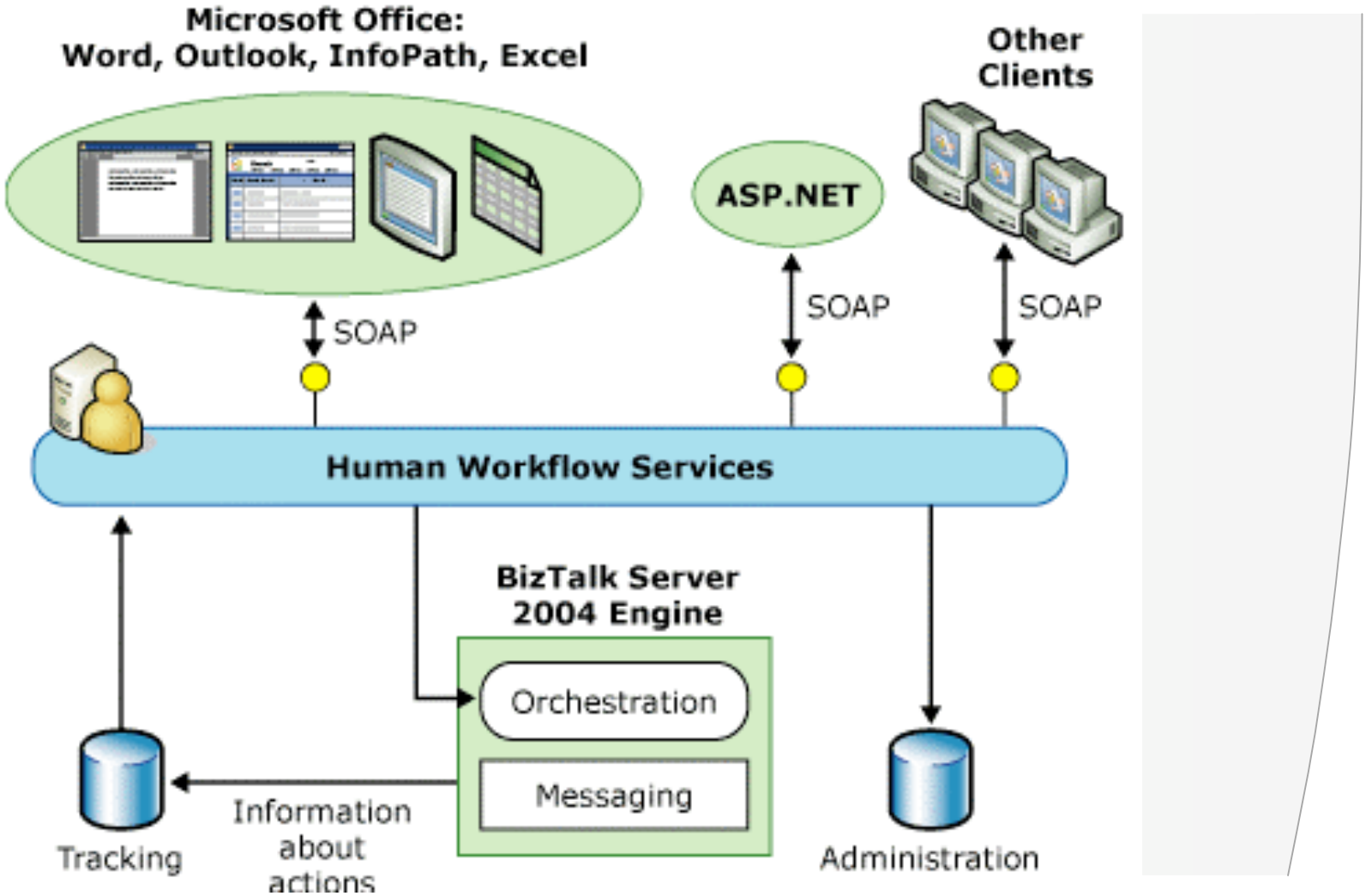
Externalize Business Rules

- Allows flexible, adaptive policy changes to happen without incurring software development cycle costs
- Integration with business process flow is vital
- Decide which business rules are externalized as a matter of policy
- Establish authority, procedures for changing policy
- Others remain embedded in business process flow, not service components

Deciding Rules to be Externalized

- Externalizing too many causes rule and policy management problems
- Select amount of rules that is “just right”
- Frequency of rule change and costs of changing rules are essential factors
- Establish change management procedures is vital
- Example: different routing of work-items based on global, transactional or organizational attribute

Human-related Business Processes



Routing Work-items

- Any relationship is possible
  - As long as there exists data [in LDAP]
- Common, existing examples
  - Route to individual users (i.e. Push)
  - Route to users in roles
  - Route to users in arbitrary named group
  - Route to managers of user
  - Route to users in same organizational unit
  - Route to user at same location

Work-item Routing Information Sources

- Global variables (e.g. DHS Threat level)
- Transaction variables (e.g. filing from the trade)
- Security identity variables (e.g. userid, manager, location, department)
- Other variables local to process or activity (i.e. scoped)

Demonstration

- WebSphere Application Developer
- WebSphere Business Integration Server Foundation
- WebSphere Process Choreographer

Our Customer

- What we planned to do
- What we accomplished
- Our lessons learned

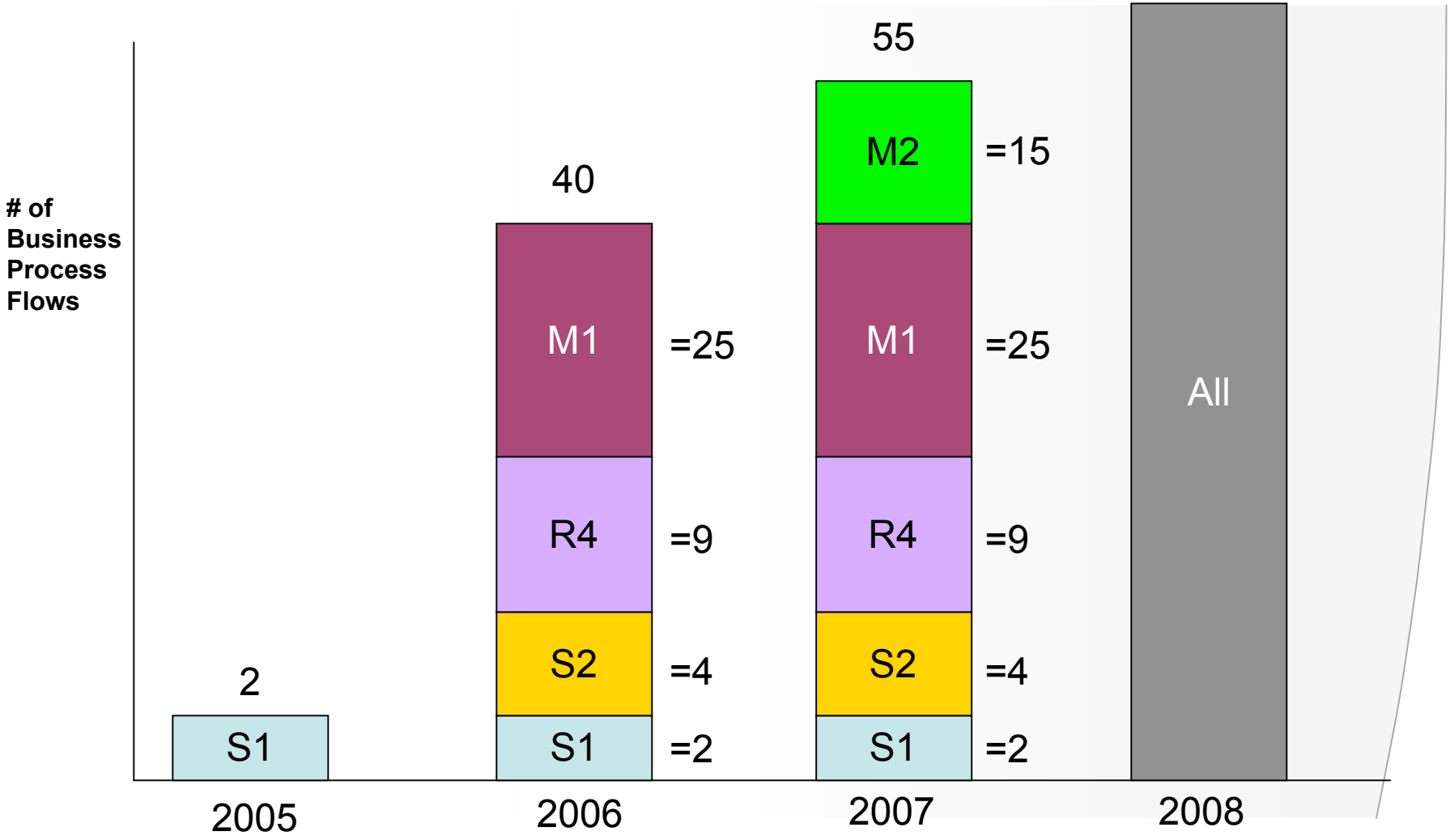
Potential BPC Applications at DHS CBP

- Capture, automate, optimize internal clearance, release, enforcement business processes
  - Compliance with laws and regulatory policies
- Integrate between CBP and the trade
  - Importers, exporters, manufacturers, freight consolidators, carriers in commodities supply-chain
- Coordinate between federal, state, local governments and institutions
  - DHS, FDA, EPA, FWS
- Reduce reliance on EDI, replace with real-time business integration services

Implemented Two Business Processes

- Criteria Management human-related workflow
  - Submittal and approval of cargo screening and targeting criteria
  - Long-running business process
  - Involves multiple parties to complete process
- External Selectivity embedded flow
  - Check other on-line sources of screening and targeting results
  - Asynchronous business process
  - Involves external systems
  - Timers deployed

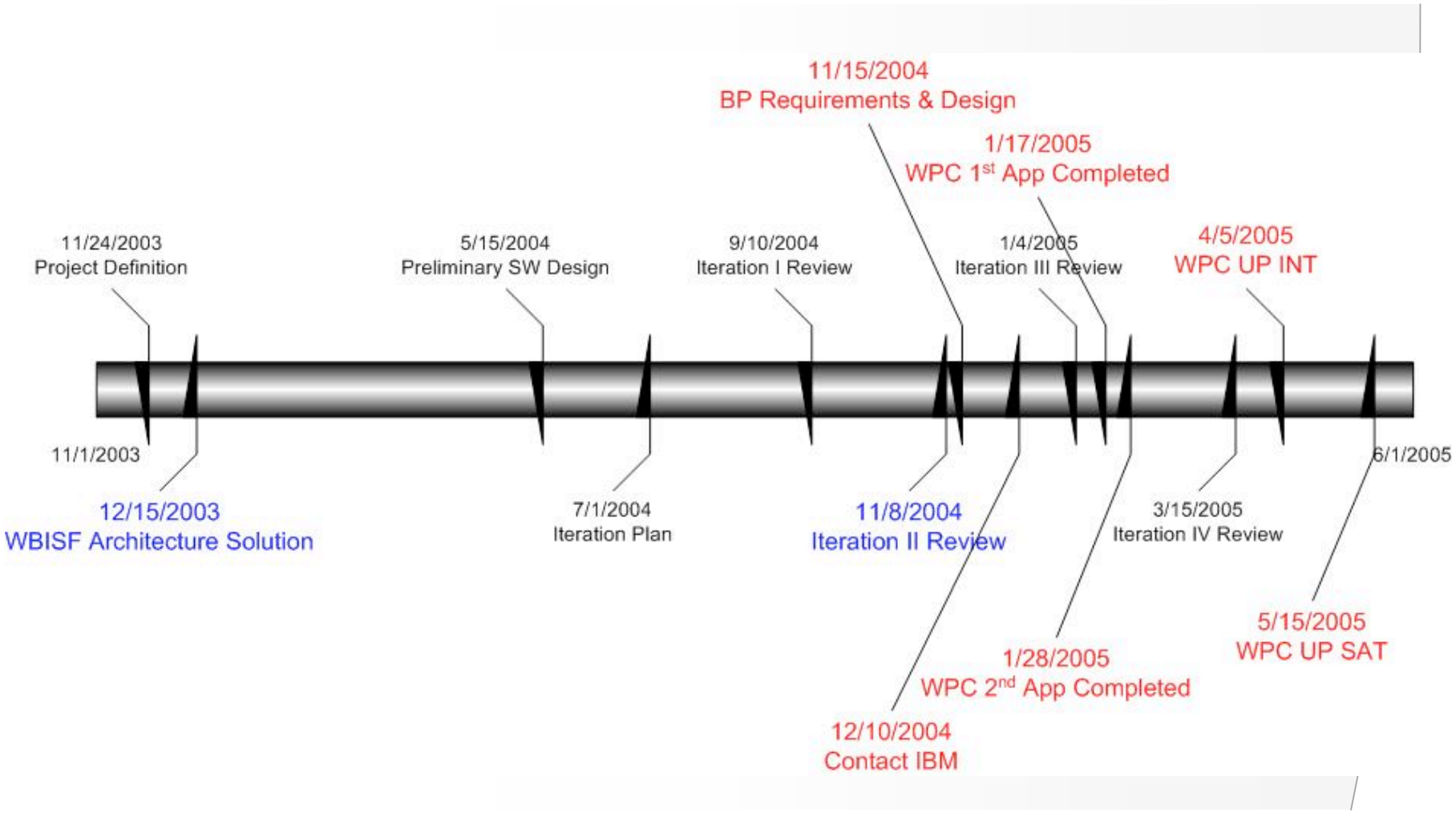
Envisioned BPC Cumulative Plan



BPC Architecture Assumptions

- COTS general performance profile
  - Performance-hardened
  - Scalable without programming changes
- Configuration in end-state environment
  - Redundant, fault-tolerant, available
  - Recoverable
- Possessing performance facts is an important communication issue

Screening & Targeting Release S1



Our Lessons Learned

- Starting too late and making a come-back
- Vital technical support from the vendor
- Relevance of management commitment
- Just-in-time administration training
- Performance perceptions and distrusting the vendor
- Irresistible temptation to code from scratch
- Ability of development projects to see broader enterprise picture

Strategies that Reduce Project Risk

- Simulating vague business processes
  - Understand timing and data availability relationships among processes
  - Confirm understanding before implementing solution
- Leveraging COTS for infrastructure capabilities
  - No custom code
- Implementing choreography early and frequently
  - Gradually add more coordination, service complexity
- Harvesting investment in legacy systems
  - Expose services embedded in monolithic systems
- Measuring performance early and often
  - Publish the facts

Successful Development Patterns

- Choose projects that quickly demonstrate business value
- Small, graduated development within a broader strategy and not “boil the ocean” approach
- Model entire business process flow, supplying no-operations for lower-risk activities
- Define interfaces before implementations
- Drive implementations needed from business process flow
- Deploy, execute and measure in small increments

Successful Enterprise BPM

- Business process management requires a comprehensive governance strategy to be a success
- A visionary plan with sound, graduated and progressive benchmarks is necessary
- Existing investment in COTS development and infrastructure platforms needs to be leveraged
- Business rules need to be externalized from code to enable flexibility and adaptability and reduce maintenance costs
- Services embedded in legacy systems need liberation
- Identity and organization information needs to become integrated with business processes, particularly for work-item routing

Our Future Direction

- Use what we learned to make our other customers successful
  - Some through IBM WebSphere Channel Partnership
- What makes us special
  - Understanding of fusing modeling with development
  - History with sophisticated development environments
  - Emphasis on stabilizing architecture early
  - Experience with iterative development
  - Ability to communicate across diverse groups
- Challenging work in so many ways
- Combination of Portfolio Management, Project Management and Business Process Management is possible

Reference Vendors/Products

- IBM WebSphere Business Integration Server Foundation (WBISF) Information Center http://publib.boulder.ibm.com/infocenter/wasinfo/v5r1/index.jsp?topic=/com.ibm.wasee.doc/info/welcome_ee.html
- WebSphere Process Choreographer http://publib.boulder.ibm.com/infocenter/wasinfo/v5r1/index.jsp?topic=/com.ibm.wasee.doc/info/welcome_ee.html
- BEA WebLogic Integration BPM http://e-docs.bea.com/wlintegration/v2_1/interm/bpmhome.htm
- SUN Microsystems SeeBeyond eInsight Business Process Manager http://www.seebeyond.com/software/einsight.asp

Reference Vendors/Products

- Oracle BPEL Process Manager
  http://www.oracle.com/technology/products/ias/bpel/index.html
- TIBCO® Staffware Process Suite
  http://www.tibco.com/software/process_management/staffware_processsuite.jsp
- webMethods Fabric, BPM
  http://www.webmethods.com/meta/default/folder/0000005918
- Pegasystems SmartBPM Suite
  http://www.pegasystems.com

IBM References

- IBM Systems Journal, Vol. 43, No. 2, 2004
  http://www.research.ibm.com/journal/sj43-2.html
- "Business process choreography in WebSphere: Combining the Power of BPEL and J2EE“
  Kloppman ET AL., IBM Systems Journal, Vol 43, No 2, 2004
- "IBM Business Integration Server Foundation V5.1 Process Choreographer Performance Report", version 1.0, May 10, 2004
  IBM Corporation

BPM Market Forecasts

- Gartner Magic Quadrant for Integration Backbone Software, 1H05, 15 April 2005 http://mediaproducts.gartner.com/reprints/seebeyond/127186.html
- BPM Market Trends & Implementations, by Insession Technologies, Inc http://whitepapers.businessweek.com/data/detail?id=1100539131_599&type=RES&src=TOPRES http://www.workpoint.com/Analysts/amr_analyst.asp
- ResearchAndMarkets, Business Process Management (BPM) Market Opportunities, Strategies, and Forecasts 2004-2009 http://www.researchandmarkets.com/reportinfo.asp?report_id=222365
- The Business Technology Network, February 05, 2004 (12:51 PM EST) "BPM Market Tops $1.2 Billion“ http://www.techweb.com/wire/story/TWB20040205S0011

Reference Standards

- Business Process Management Initiative http://www.bpmi.org/
- Organization for the Advancement of Structured Information Standards (OASIS) http://www.oasis-open.org/home/index.php
- Business Process Execution Language for Web Services http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnbizspec/html/bpel1-1.asp
- Business Process Modeling Notation (BPMN) Version 1.0, May 3, 2004 Business Process Management Initiative www.bpmi.org
- Business Process Management Group www.bpmg.org
- OASIS UDDI http://www.uddi.org/

Other References

- Wikipedia (BPEL)
  http://en.wikipedia.org/wiki/BPEL
- David Chappel, “Understanding BPM Servers”
  http://www.davidchappell.com/articles/Understanding_BPM_Servers.pdf