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October 29-31, 2007
Plano, Texas

Case Study: A Leading Transportation and Logistics Company Leverages SOA to Increase Business Value

Session 22

October 30, 2007 09:45a.m. – 10:45 a.m.

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3 Steps to Delivering Business Value with SOA and EDA

- **First a systematic approach to SOA results in Reuse of Software components**
 - Value: Accelerated Time to Market and Lower Development Costs
- **Second, automated loosely coupled business processes initiated by triggered events in an EDA enable real time business**
 - Value: Software Maintenance is Facilitated and Customer Demand Met
- **Third, published business events provide a look at the current state of affairs through Complex Event Processing – CEP**
 - Value: Real-time predictive insight into threats and opportunities in the business environment



Each step builds on the previous one and enables the next increase in value.

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Agenda

- **Introduce Con-way**
- **The Business Problem**
 - IT Objectives
- **The Evolving Architecture**
 - Business Components
 - Service Oriented Architecture
 - Event Driven Architecture
- **Summary**
 - Results So Far
 - Lessons Learned
- **Recommendations**

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Introducing Con-way Inc.

- Con-way Inc. (NYSE: CNW) is a \$4.7 billion freight transportation and logistics services company headquartered in San Mateo, Calif.
- Named FORTUNE magazine's "Most Admired Company" in transportation and logistics for 2007, Con-way delivers industry-leading services through three primary operating companies: Con-way Freight, CFI and Con-way Truckload Services and Menlo Worldwide.

- **Con-way Freight**
 - The company's largest subsidiary
 - \$2.8 billion transportation and services enterprise
 - Provides time-definite and day-definite freight delivery and related transportation services for commercial and industrial businesses in the United States, Canada and Mexico.



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The Business Problem

- Continual Competitive Pressure to Differentiate
- Need IT Solutions Faster to Support the Business
- Must Quickly Embrace New Business Opportunities
- Increasing and Changing Customer Demands
- Need to Know in Real-Time
- Inefficient Dual Entry into Multiple IT Systems
- Inertia in the Adoption of Enabling Technologies

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The Evolving Architecture

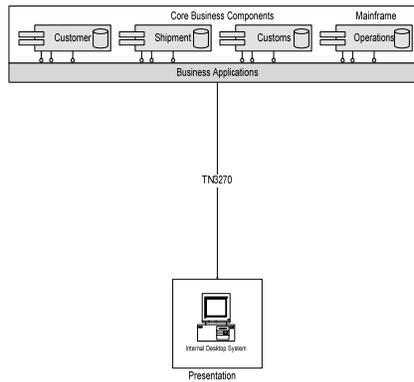
- Business Components – A taxonomy has been defined partitioning functionality into Business Domain, Core Business, Business Infrastructure, and Technical Infrastructure Components.
- Service-Oriented Architecture – Simple and composite services are offered on the business components in the J2EE environment.
- Event-driven Architecture – Mission-critical business events are published near real-time to the Enterprise Integration bus
- Service Orchestration – Integration processes subscribe to events and orchestrate services required to complete a fully automated business process
- Canonical Model – Business objects are semantically mapped to and from a canonical model at the endpoints providing a common understanding in the middle
- Service Monitoring and Management – ensures that the infrastructure is functioning smoothly

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CBD: Component Based Development

- Embraced Component-Based Development in 1998
- Back-end business functional areas have been partitioned into components and the business functionality exposed as component operations.
- Component operations meet the functional definition of a service as they are consumed by other applications through interfaces.

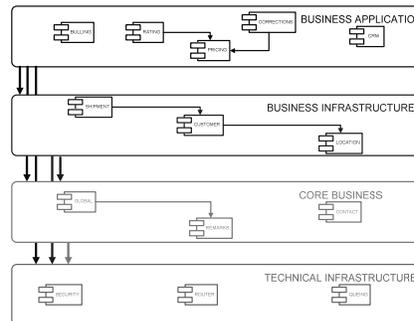


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CBD: Component Taxonomy

- A Component Taxonomy categorizes the components into
 - Business Application
 - Core Business
 - Business Infrastructure
 - Technical Infrastructure
- Benefits
 - Helps defining complexity of service and cost estimation
 - Provides a better understanding of granularity of services
 - Helps in specifying the principles of service interaction like the consumption rules.

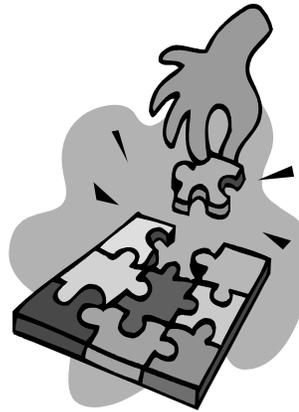


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CBD: Component Boundaries

- **Proper component boundaries are established by**
 - Evaluating Business Model
 - Evaluating Usage Scenarios
 - Identifying Common Dependencies
 - Identifying Inseparable groupings
- **Benefits**
 - Helps establish ownership of components
 - Facilitates loose coupling
 - Reduces data redundancy

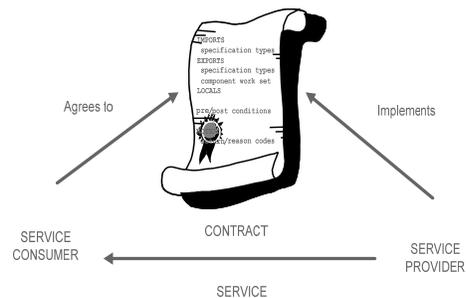


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CBD: Service Contracts

- **All Operations use standard service contracts.**
 - Description of functionality
 - Inputs
 - Outputs
 - Pre and Post Conditions
 - Possible Exceptions
- **Benefits**
 - Promotes consistency across components
 - Helps gain developer trust

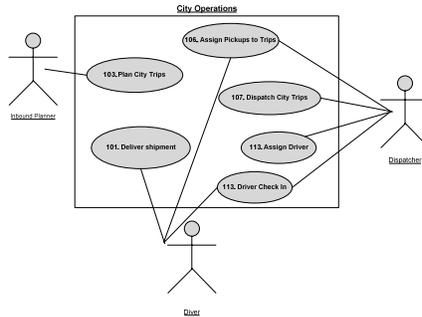


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Use Cases

- **Use Case Analysis to identify**
 - Services
 - Candidate business Interfaces
 - Key Business Concepts
 - Business Events
- **Benefits**
 - Services are more business oriented.
 - Helps define a common vocabulary for all services which results in a canonical model for better integration.
 - Facilitates better orchestration of services.
 - Facilitates better management of requirements change.



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CBD: CA Gen Implementation

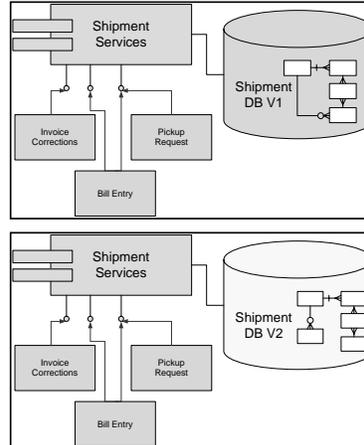
- **CA Gen is used to develop and implement back end components**
 - Components are created as ID models
 - Provide sub-transactional and transactional services as operations.
 - Applications are assembled in UD models
 - Provide composite transactional services as proxies.
 - The Specification models serve as a Service Repository.
- **Governance**
 - Publication/Consumption
 - All publications and consumptions are done by the configuration mgmt. team. New operations are reviewed by the component owners and exceptions to consumptions are reviewed by architecture team.
 - Versioning Standards
 - Operations are versioned for signature changes to minimize impact on existing consumers.

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Benefit: Reduced Impact of Change

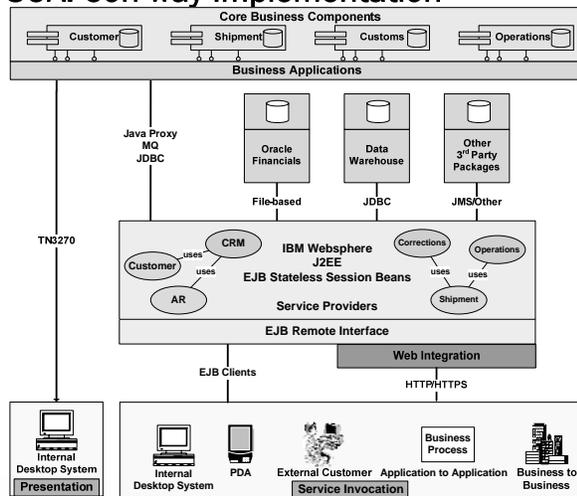
- Shipment functionality was offered via services
- 4 years ago the shipment DB was reengineered.
- Reengineering was completed without impact to consuming apps



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SOA: Con-way Implementation

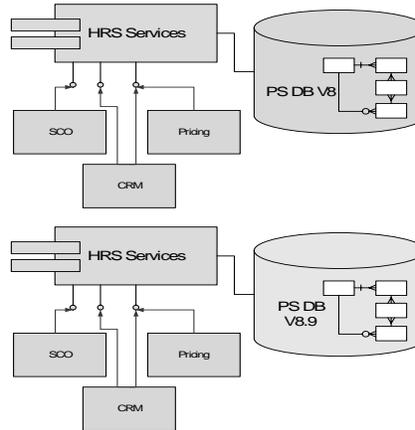


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SOA Benefit: Reduced Impact Of Change

- We use People Soft for HRMS
- Employee Data for all other applications are provided by wrapping the PS data in a CA Gen component for the back end, a ejb remote interface for the J2EE platform and web services for all other.
- Beginning of 2007 we upgraded from People Soft V8 to V8.9
- The upgrade was performed without any impact to the consuming applications.

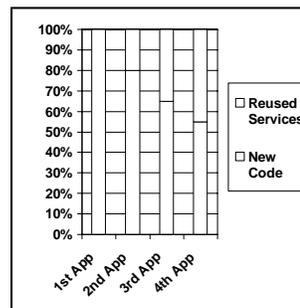
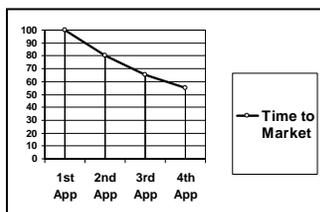


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SOA Benefit: Time To Market

- Almost all apps use Core Business Components -Customer and Shipment
- This has greatly reduced time to market for subsequent projects

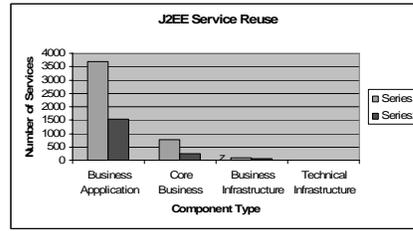
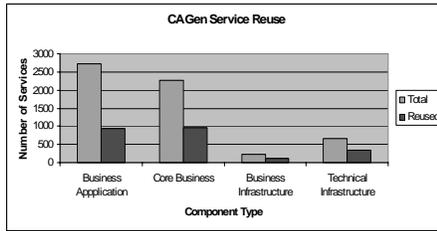


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SOA: Reuse Statistics

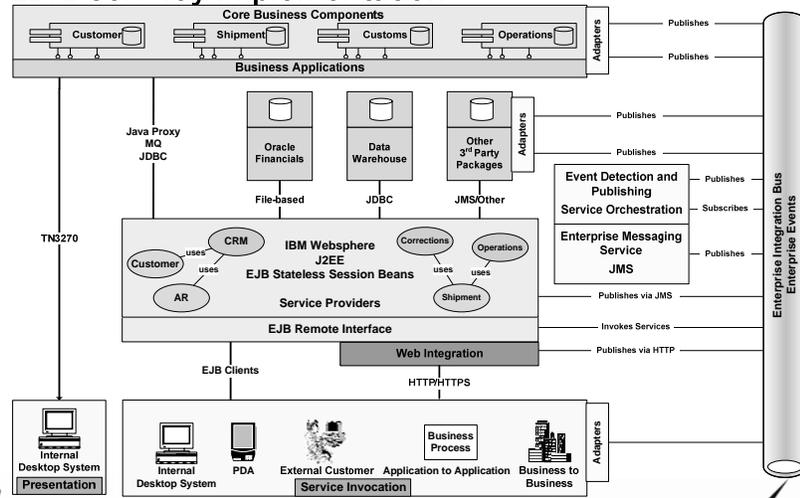
CA Gen	Type	Total	Reused	% Reuse	J2EE	Type	Total	Reused	% Reuse
	Business Application	2728	932	34.1642		Business Application	3679	1538	41.8048
	Core Business	2261	962	42.5475		Core Business	766	235	30.6789
	Business Infrastructure	219	125	57.0776		Business Infrastructure	96	64	66.6667
	Technical Infrastructure	662	342	51.6616		Technical Infrastructure	10	6	60



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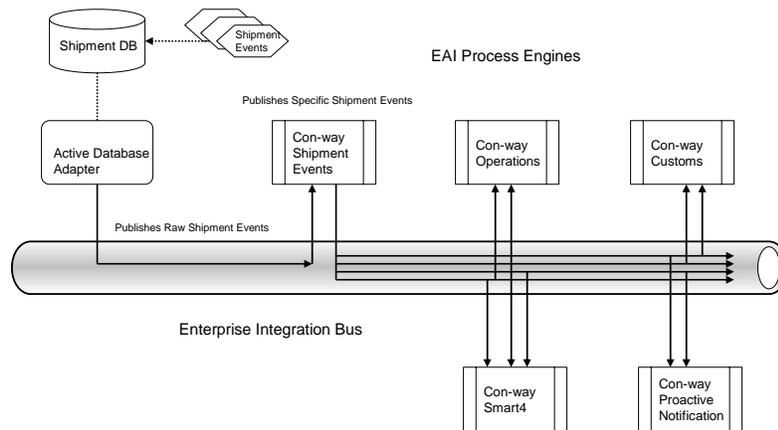
EDA: Con-way Implementation



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EDA: Events Trigger Automated Business Processes



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EDA Benefit: Business Agility

- **Con-way won a CIO-100 award in 2004 for 2 initiatives that involved SOA and provided great business value.**
 - Guaranteed freight delivery service or no charge to shipper
 - Warranty functionality leveraged existing services in the Shipment Business Component, Corrections, Invoicing, Shipment event Notification
 - Implemented in less than 2 months
 - Dynamic invoice corrections based on field shipment reweighs and content inspections
 - Integration of Corrections, Confirm Reporting, Invoicing and Wireless Scales Mounted on Forklifts
 - Implemented in 3 months

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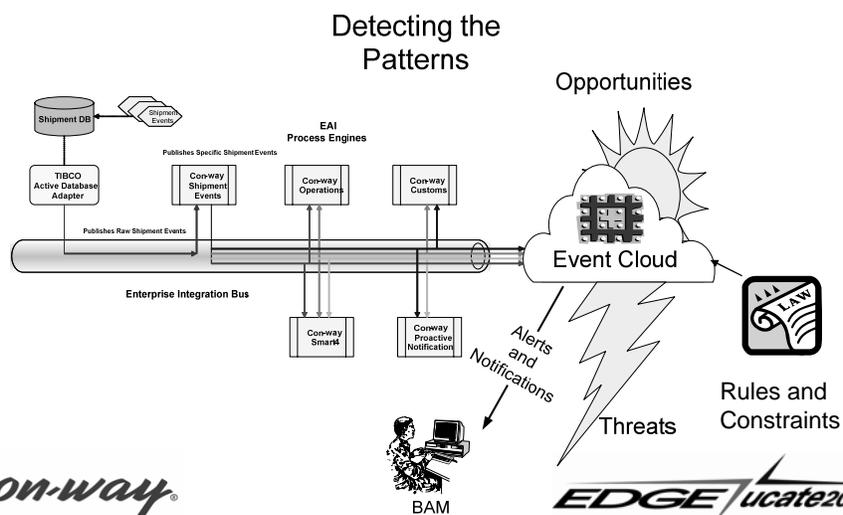
EDA: Tangible Business Value

- **Savings on Canadian and US Customs Border Crossings**
 - The crossing time for some trucks has gone from 2-3 hours to less than a minute as they are pre-cleared by the time they reach the border. This is worth tens of thousands of dollars a day
- **Automated handling of Appointment Freight has removed a step that was done manually by service centre personnel**
 - There are between 6,500 – 10,000 appointment shipments per day.
 - Elimination of the manual process (approximately 2-3 minutes per shipment) saves up to 500 man-hours daily.
- **Integration with the wireless handheld devices results in saved time**
 - Elimination of manual steps to record delivery and pickup confirmations
 - Savings in driver time
- **Automated Identity & Access Management**
 - The automated identity management process triggered by HR events saves IT Security Administration time and provides real time access control

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CEP: Managing Business Process SLAs



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Summary: Results So Far

- Greatly shortened time-to-market for new major business initiatives through reuse of existing services
- Reduced development costs by writing increasingly less code
- Reduced time required for border crossings from 2-3 hours to less than a minute through event-driven integration with US/Canadian Customs processing
- Saved up to 500 man-hours daily by eliminating redundant data entry and manual processes.
- Provided real-time decision support for Operations, Sales and Finance personnel with zero latency in the flow of mission critical data. Millions of business events are being published and processed in an event-driven manner
- Enabled an agile architecture facilitating change both in the business and technical arenas including integration hooks for advanced dock simulation, dock automation, handheld devices, emerging technologies and e-Business processes.
- Con-way has won several awards - CIO-100 award '04 - '06, InfoWorld 100 Innovation '05 - '06, InfoWeek 100 - '06 in recognition of their SOA/EDA implementation and the value delivered to the business

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Summary: Lessons Learned

- Establish a governance process to adopt SOA across project boundaries in order to achieve software component reuse
- Involve solution architects that operate outside the boundaries of individual projects in choosing the right component boundaries and service granularity to foster reuse in multiple contexts and modes
- Recognize that successful SOA is as much an organizational evolution as it is a technology revolution
- Create a design pattern that will expose services that are extensible
- Code all business level methods for reuse whether anticipated or not
- Educate developers to first look for existing services before building their own
- Gain developer trust in services they do not control by ensuring good quality
- Implement a meaningful repository of services and events across technologies

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Recommendations

- Recruit Sponsorship **from IT Executive Management**
- Choose the right pilot project **to ensure success as the first step of SOA enablement and evangelize**
- Establish Services Governance
 - Architect business components with the optimum boundaries and service granularity
 - Help developers find services that fit their needs
 - Establish quality processes that will gain developer trust in services
 - Encourage adequate descriptions of services, pre- and post-conditions as well as any exceptions
- Develop canonical model of key business objects **within your enterprise to be used in the integration layer**
- Architect for adaptability **to ensure new technology approaches can be adopted without major impact to existing implementations**
- Embrace industry standards **where possible to ensure software vendor and hardware platform neutrality**

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Questions & Answers

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EDGE Needs Your Feedback!

- Please complete the conference evaluations
- Your feedback/suggestions are necessary to continue to bring you top-notch events
- Thank You for Coming – See you in 2008!

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