Data/Analysis Challenges in the Electronic Business Environment

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The Classical Supply Chain
(Source: H. Donald Ratliff)
The Future Organization

Company Infrastructure

Logistics

Operations

Service

Marketing & Sales

Program Management
An Integrated Future

- Supply Chain
- Electronic Commerce
- Retail Trading
- Auctions
- Financial Trading
- ...
Electronic Business Architecture

- Services
  - Business Specific
    - manufacturing
    - logistics
    - knowledge
  - Shopping
  - Catalog/Configure
  - Exchange
  - Trading

- BackOffice
  - Provisioning
  - Billing
  - Order Management
  - Accounting

- Portal
  - Personalization
  - Entitlement/Security
  - Notification
  - Content Directories
  - Community Services
  - Generic Content

- Internet
  - Business to Customer
  - Business to Business

- EDI
The Electronic Business Model: yourCompany.com
Hierarchy of Problems and Activities

People
Procedures, Processes and Organization
Applications
System Software and Protocols
Physical Devices and Systems
Principal Methodologies

People: Survey and Therapy

Procedures, Processes and Organization: Survey

Applications: Test

System Software and Protocols: Test and Simulation

Physical Devices and Systems: Analysis, Test & Simulation
Closing the Loop

People

Procedures, Processes and Organization

Applications

System Software and Protocols

Physical Devices and Systems
Challenges in the New Environment
eBusiness Challenges

- **Attracting & keeping customers**
  - Eyeballs, user experience, branding, stickiness
  - Business to Consumer & Business to Business

- **(Internet) Time to Market**
  - Rapid implementation of new services
  - Lots of competition

- **Backend Integration: Single Biggest Problem**
  - Content Sources, Legacy Systems
  - ERP, Customer Service, Sales Force Automation, Tax, Data Warehouse, Logistics

- **Quality of Service**
  - real-time, transactions, availability, performance, scalability

- **Lack of experienced resources**
  - management, domain, architects, development
DARPA/ITO Model: Cross Cutting Technologies

- Computational prototyping
- Simulation
- Behavior prediction
- System integration technologies
- Design environments for evolvable systems
- Composition of non-functional attributes
- Failure and vulnerability models
- Assessment tools and metrics
- Large-scale simulations
- Formal system models
The Distributed Future

- Distributed Heterogeneous Resources
- Seamless Distributed Computing Environment
- Integrated Human/Computer Interaction
- Assured Dynamic Response
- Adaptable Computing and Network Elements
- Robust Performance and Survivability
Integrated Research Challenges

- Ease of Use
- Group Interaction
- Human/System Interaction
- Organizational Adoption
- Customer Patterns
- Supply Chain Management
- Knowledge Management

- Scale/Size/Density
- Mobility
- Speed
- Real Time
- Availability
- System Management

- Situational Awareness
- Gesture, Image Understanding
- Concept Recognition
- Speech & Text Understanding
- Knowledge Representation
- Bandwidth Adaptive Visualization
- Rapid Data Access & Analysis
- Semantic Representation

- Latency
- Placement
- Common support services
- Access
- Storage
- Scheduling
- Configuration Management
- Performance

- Intensity of Support
- Incremental Development
- Ease of Use
- Development Time
- Specification & Composition
- Assurance

- Detection
- Assurance
- Security
- Adaptability
- Fault Tolerance
- Survivability

- Insertion
- Assurance
- Interoperability
- Scalability
- Performance Prediction
- Information Management
The Real Challenge
Shielding the Mechanics

Simulation

Live Interaction

"Thermodynamic" Theory

Network

Model
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Netcentricity Laboratory

Extended Supply Chain

Simulated Company

Company A

Company B

Process Coordination
Data Integration
Management & Monitoring

Web E-Commerce

Business to Customer Link
Enterprise Messaging
Application Integration

Content Representation

Remote Devices

The Network