UNDERSTANDING ENTERPRISE APPLICATION INTEGRATION

APPROACHES, TECHNOLOGIES, AND ISSUES

David McGoveran
Alternative Technologies
13150 Highway 9, Suite 123
Boulder Creek, CA   95006
Telephone: 831/338-4621
www.AlternativeTech.com

BEFORE YOU LEAVE…

PLEASE FILL OUT YOUR EVALUATIONS.

Thank you!

OVERVIEW

- **Definition and Market**
  - WHAT EAI IS

- **Planning for EAI**
  - BUSINESS AND TECHNOLOGY DRIVERS AND BENEFITS
  - KEY STEPS TO TAKE
  - ROLE OF APPLICATION SERVERS

- **EAI Approaches**
  - PROCESS, DATA, MIDDLEWARE, MODEL
  - HOW TO SELECT THE RIGHT ONE

- **An I.T. Infrastructure for EAI**
  - FUTURE OF EAI
  - ISSUES AND ADVICE

PART I

DEFINITION AND MARKET

EAI: Confusion or Emergence?
ITS A PROCESS!

"**Enterprise Application Integration is defined as the <u>continuous process</u> of improving (modifying, integrating, rationalizing, and adapting) the enterprise's entire information technology base-applications, information, communications, and infrastructure to support the business.**" **-- Yankee Group**

Is EAI any such process that improves IT?

EAI: Confusion or Emergence?
NO, ITS ABOUT SHARING DATA!

"EAI is nothing more than the sharing of information among custom or packaged stovepipe applications. … In other words, EAI exposes the data of any application to any other application." **-- Linthicum**

Does the data needs to be moved?
Or accessed? Or transformed?

EAI: Confusion or Emergence?
OH, SO ITS ABOUT MESSAGING!

"Application integration solutions are <u>based on</u> <u>messaging middleware</u> technology. By providing more abstract interfaces, broader functionality, and connectors or adapters for applications, application integration technologies let IT departments connect and coordinate data and events among multiple applications." **-- Hurwitz**

Well . . .

Now I see why RPCs aren't useful for EAI!

EAI: Confusion or Emergence?
OH, SO ITS ABOUT <u>ANY</u> MIDDLEWARE!

"EAI is an approach to the integration problem that uses a middleware layer of standard interfaces to mediate interactions among legacy applications, purchased packaged applications, and new Web functionality." -- Concept Five

I must be confused . . .

. . . middleware = interfaces?

What is EAI?

"Enterprise Application Integration is the business strategies, processes, and technologies intended to provide seamless and uniform development, extension, perception, use, and management of the means to execute business functions." **-- Alternative Technologies**

The Role of Application Servers

- **ENTERPRISE APPLICATION SERVERS FOR EAI**
  - A KEY MIDDLEWARE FACILITY
  - STATE MANAGEMENT
  - AVAILABILITY, LOAD BALANCING, AND SCALABILITY
  - RAPID LEGACY, ERP, AND WEB INTEGRATION
  - MAY BE ESSENTIAL FOR E-COMMERCE

- **EAI ENHANCES APPLICATION SERVER VALUE**
  - ADD EAI BENEFITS TO THE COST/BENEFIT ANALYSIS
  - MAKES AN APPLICATION SERVER CONCEPT EASIER TO SELL
  - EAI FOCUSES THE PURPOSE OF A.S. ON THE ENTERPRISE
  - HELPS US UNDERSTAND THAT THE KEY WORD IS "SERVER"
    - » EACH SERVICE IS PROVIDED BY ONE OR MORE SERVERS
    - » AN APPLICATION IS A SERVICE WITH IDENTIFIABLE BUSINESS VALUE

EAI Challenges

- **Few EAI Methodologies**
  - RELATIONSHIP TO EXISTING I.T. METHODOLOGIES?
- **EAI Scoping is Frequently Poor**
  - BUSINESS GOALS VERSUS TECHNICAL GOALS
  - NUMBER OF BUSINESS FUNCTIONS AND WHO IMPACTED
  - CROSS-ENTERPRISE AND VIRTUAL ENTERPRISE
- **Economics of EAI are Poorly Understood**
- **Relationship of EAI to Business**
  - MANAGEMENT CHANGES AND BUSINESS PROCESS OPTIMIZATION
- **EAI Requirements on I.T. Infrastructure**
  - DATA, MESSAGING AND COMMUNICATIONS BACKBONE
  - PROCESS MANAGEMENT
  - SCHEDULING
  - TRANSACTION MANAGEMENT AND RECOVERY

WHERE WE ARE

✓ **Definition and Market**

    – **WHAT EAI IS**

• **Planning for EAI**

    – **BUSINESS AND TECHNOLOGY DRIVERS AND BENEFITS**

    – **KEY STEPS TO TAKE**

    – **ROLE OF APPLICATION SERVERS**

• **EAI Approaches**

    – **PROCESS, DATA, MIDDLEWARE, MODEL**

    – **HOW TO SELECT THE RIGHT ONE**

• **An I.T. Infrastructure for EAI**

    – **FUTURE OF EAI**

    – **ISSUES AND ADVICE**

PART II

PLANNING FOR EAI

Business Drivers of EAI

- **Competitive Advantage**
- **Agility & Resiliency in the Face of Frenetic Change**
- **Time to Market**
- **Shorter Cycle Times**
- **Mergers and Acquisitions**
- **Deregulation**
- **Multi-regional and Multi-authority Regulation**
- **Supply Chain Integration**
- **One-One Marketing**
- **E-Commerce and Virtual Enterprise**
- **Y2K Liabilities and Operational Risks**

Business Benefits of EAI

- **Improved Operating Efficiencies**

- **Improved Information Flow**

- **Consolidated Business Analysis**

- **Single Point of Management**

- **Predictability and Repeatability of Business Processes**

- **Leverages Existing Investments**

- **Improved Customer Satisfaction and Retention**

- **Reduced Cost of Ownership**

- **Increased ROI**

Business Issues

- **What Are the _Economics of Integration_?**

  - **TCO, ROI, AND ROR DON'T TELL THE WHOLE STORY**

    - » *EAI PROVIDES MUCH MORE THAN COST CONTAINMENT AND REDUCTION*

  - **NO ACCEPTED VALUE MODEL FOR OPPORTUNITY CAPTURE**

  - **MUST USE PILOTS AND CASE STUDIES**

- **Dependence on I.T. Heavy and Growing**

  - **30%OF ALL MISSION CRITICAL APPLICATION CODE IS BUSINESS RELATED -- Standish Group**

    - » **I.E.,** *ITS ABOUT PROCESS FLOW AND BUSINESS RULES!*

  - **REMAINING 70% IS INFRASTRUCTURE**

    - » **I.E.,** *CEOs & CFOs DON'T UNDERSTAND I.T. INFRASTRUCTURE!*

Business Issues

- **Business Lacks Confidence in I.T.**
  - *85% OF BUSINESS MANAGERS SEE I.T. AS AN <u>IMPEDIMENT</u>!*
  - ALMOST 85% OF DEVELOPMENT NOT SUCCESSFULLY COMPLETED
  - 58% OF LARGE SYSTEMS PROJECTS OVER BUDGET
  - 63% OF PROJECTS OVER SCHEDULE
  - TOO SLOW, TOO EXPENSIVE, OUT-OF-DATE
  - ONLY X% OF I.T. MANAGERS THINK THEY CAN KEEP UP

- **But Business Needs**
  - UNDERSTANDABLE TECHNOLOGY THAT DELIVERS DIFFERENTIATION *<u>RAPIDLY</u>*
  - TAKE ADVANTAGE OF ECONOMIES OF SCALE
  - CAPITALIZES ON EXISTING TECHNOLOGY

*CHAOS Report, The Standish Group and Open Systems Advisors

Conclusion . . .

Business Needs Enterprise Application Integration!

Technology Drivers for EAI

- **Growth of ERP and Packaged Applications**

- **Y2K and EMU**

- **New Software Categories and New Technologies**

    - **COMPONENTS, STANDARD APIs AND COMMUNICATION PROTOCOLS, DISTRIBUTED OBJECTS, APPLICATION SERVERS, AND MIDDLEWARE (ORBS, MOM, OTMS)**

- **Requirements for Modified and Extended Functionality**

Technology Drivers for EAI

- **Insufficient I.T. Resources**

  - CUSTOM PACKAGE DEVELOPMENT AND MANAGEMENT

  - REUSE OF ASSETS NOW MANADATORY

  - CONSTANT CHANGE AND NEW FUNCTIONAL REQUIREMENTS

- **Legacy Application Anchor**

  - CAN'T REVERSE ENGINEER

  - TOO FRAGILE TO TOUCH THEM TO MODIFY OR EXTEND

  - AFRAID TO REPLACE OR ABANDON

Key Steps to Take
A BRIEF CHECKLIST FOR EAI PLANNING

- **Identify Your Business Goal(s)**
  - COST CONTAINMENT? FOR BUSINESS OR I.T.?
  - CUSTOMER SERVICE LEVELS?
  - GREATER AGILITY? MERGERS AND ACQUISITIONS?

- **Scope the Effort**
  - CROSS TECHNOLOGY? CROSS BUSINESS FUNCTION?
  - DEPARTMENT? DIVISION? B2B? B2C? E-COMMERCE?
  - WHO WILL BE AFFECTED AND HOW?

- **Establish a Strategy**
  - LONG vs. SHORT TERM
  - LOCALIZED (ISLANDS OF INTEGRATION) OR ENTERPRISE-WIDE?
  - TOP-DOWN OR BOTTOM-UP?

Key Steps to Take
A BRIEF CHECKLIST FOR EAI PLANNING

- **Establish a Business Integration Plan**
  - PROCESSES AND ENVIRONMENTS

- **Identify Realistic Technical Integration Targets & Scope**
  - FRONT OFFICE AND BACK OFFICE?
  - WEB WITH ERP OR ACROSS ERP?
  - DATA STORES?
  - TECHNOLOGIES: NEW (e.g., COMPONENTS) AND OLD (e.g., LEGACY)

- **Determine Technical Resources and Impact**
  - SKILLS, INFRASTRUCTURE, KNOWLEDGE, TOOLS, STANDARDS

- **Select the Best EAI Approach for Your Company**
  - MIDDLEWARE-CENTRIC
  - DATA-CENTRIC
  - PROCESS-CENTRIC
  - MODEL-DRIVEN

The EAI Market

- **IDC**
  - **$46B ON INTEGRATION IN 1997**

- **FORRESTER**
  - **40% OF CORPORATE IT BUDGETS**

- **GARTNER**
  - **ANALYSIS OF CROSS ENTERPRISE SOFTWARE**
  - **GROWING AT 150% CAGR**
  - **$5.7B IN 2002**
  - **ABOUT $1B IN 2000 AND $3.2 IN 2001**
  - **MOVING DATA IS 35-40% OF PROGRAMMING EFFORT**
    - » **DATABASE TO DATABASE**

The EAI Market

- ## META
  - GLOBAL 2000 USE AN AVERAGE OF 49 SEPARATE (PACKAGED) APPLICATIONS

- ## Standish Group
  - 70%OF APPLICATION CODE IS INFRASTRUCTURE
  - $24B PER YEAR ON APPLICATION INTEROPERABILITY

- ## Other Estimates
  - $59B 2001
  - 11% CAGR
  - MORE THAN 90%OF THIS IS SERVICES
  - SUPPLY CONSTRAINED

How EAI is Affecting I.T.

- **Changing Priorities**
  - EAI IS ENABLING THE NEW FOCUS ON RE-USE AND PACKAGED APPLICATIONS
  - UNDERSTANDING THE BUSINESS

- **A New Enterprise Focus on Infrastructure**
  - A RESURGENCE IN ENTERPRISE ARCHITECTURES
  - KEY TECHNOLOGIES FOR ALL ASPECTS OF INTEGRATION

- **System Management**
  - MULTIPLE LEVELS OF SYSTEM MANAGEMENT
  - INTERFACE AND APPLICATION TO APPLICATION

- **Need for EAI Expertise**
  - KNOWLEDGE OF INTEGRATION PROJECT MANAGEMENT
 - INTEGRATION APPROACHES
  - TOOLS AND METHODOLOGIES

Where We Are

✓ **Definition and Market**

 – WHAT EAI IS

✓ **Planning for EAI**

 – BUSINESS AND TECHNOLOGY DRIVERS AND BENEFITS

 – KEY STEPS TO TAKE

 – ROLE OF APPLICATION SERVERS

• **EAI Approaches**

 – PROCESS, DATA, MIDDLEWARE, MODEL

 – HOW TO SELECT THE RIGHT ONE

• **An I.T. Infrastructure for EAI**
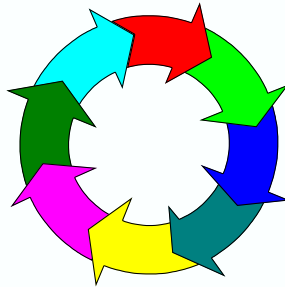
 – FUTURE OF EAI

 – ISSUES AND ADVICE

PART III

EAI APPROACHES
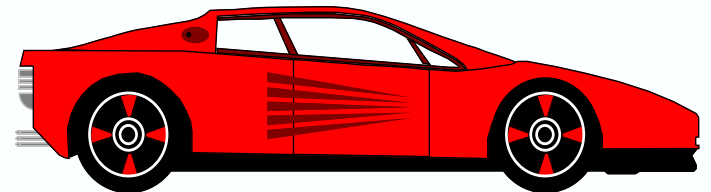
An Overview of Approaches

MIDDLEWARE-CENTRIC
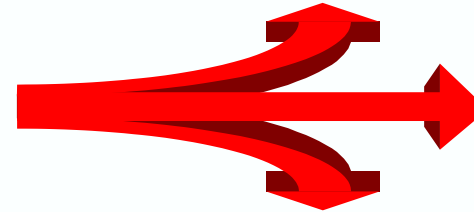
DATA CENTRIC

PROCESS–CENTRIC

MODEL-DRIVEN

The Middleware-Centric Approach

Focus

– *THE TECHNOLOGY USED TO MANAGE AND IMPLEMENT THE INTERCONNECTION OF APPLICATIONS AND APPLICATION COMPONENTS.*

> "WHAT TECHNICAL INFRASTRUCTURE WILL SUPPORT WHAT."

• Types of Middleware

– CONNECTION

– DATABASE AND REPOSITORY

– TRANSACTION *MIDDLEWARE-CENTRIC*

– MOM

– ORBs AND MESSAGE BROKERS

– DIRECTORIES

– APPLICATION SERVERS
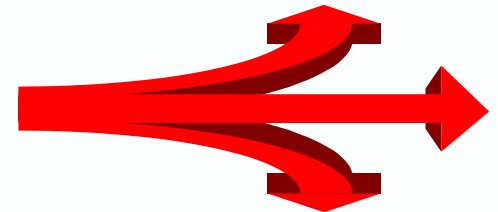
The Middleware-Centric Approach
TECHNICAL ISSUES

- **Protocols and Standards**
  - COM vs. CORBA vs. M/F
  - INSTABILITY MEANS VENDORS CAN'T KEEP UP
  - NO INTEGRATION STANDARD

- **Interface Definition and Data Marshalling**
  - CUSTOM vs. XML??
  - DATA TYPES, INITIALIZATION, BEHAVIOR, ERRORS, SECURITY

- **Incompatibilities**
  - SOURCE LANGUAGES AND LEGACY INTERFACES

- **Difficult Transaction Coordination**
  - OTM, TPM, 2PC, ROLLBACK, RECOVERY

- **Performance Problems**
  - STACK DEPTH, NAMING AND DIRECTORY SERVICES RESOLUTION

The Middleware-Centric Approach
PROS AND CONS

PROS

- ESTABLISHES ESSENTIAL INFRASTRUCTURE
    - » *KEY TO IMPLEMENTING A TECHNICAL ARCHITECTURE*
- FOCUS ON I.T. TRADITIONAL CORE COMPETENCIES
- MOTIVATES TECHNICAL STAFF
- VALUABLE IF OTHER APPROACHES USED LATER

CONS

- HEAVY INVESTMENT OF TIME AND MONEY
- EASY TO MISALIGN WITH BUSINESS OBJECTIVES
- ROI DEPENDS ON SIGNIFICANT REUSE
    - » *BEFORE THE TECHNOLOGY CHANGES!*
    - » *DIFFICULT TO ANTICIPATE TECHNOLOGY DIRECTIONS*

The Data-Centric Approach

Focus

- *MAKING DATA FROM ONE OR MORE APPLICATIONS AVAILABLE AS INPUT TO ONE OR MORE OTHER APPLICATIONS*

  "WHAT DATA CAPTURES WHICH EVENTS."
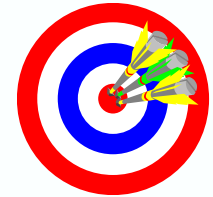
- **Types of Data-centric Integration**

FROM \ TO	DATA STORE	APPLICATION
DATA STORE	utilities, custom programs, replication, copy management	extract, direct access
APPLICATION	direct access, screen scraping	screen scraping, APIs, interface generators, transformation hubs

The Data-Centric Approach
PROS AND CONS

PROS

– **FAMILIAR DESIGN PROCESS**

– **NUMEROUS TOOLS AND AVAILABLE TALENT**

– **WELL-DEFINED DATA ACCESS PROTOCOLS**

– **COST IMPROVEMENT OPPORTUNITIES**

  » *"70% OF EXTRACTION, CLEANSING, AND LOADING PROCESSES ARE BUILT BY HAND." --- META GROUP*

CONS

– **REQUIRES MIDDLEWARE**

  » *DATABASE, CONNECTION, AND TRANSACTION ORIENTED*

– **REQUIRES DISCIPLINE TO AVOID CREATING PROBLEMS**

  » *MAY BYPASS KEY PROGRAMS*

  » *CAN INTRODUCE ERRORS OR INTEGRITY PROBLEMS*

  » *TRANSACTION CONSISTENCY OFTEN LOOSE*

The Process-Centric Approach

Focus

– *INTEGRATING PROCESSES, CONNECTING THE EXECUTION OF BUSINESS FUNCTIONS IN TIME.*
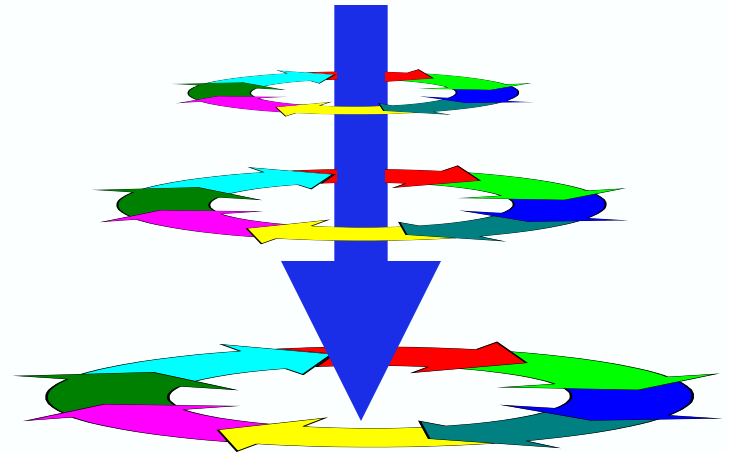
"WHAT MUST BE DONE AND WHEN."

- **Multi-Level Processes**
  - **B2C, B2B, ENTERPRISE, WORKFLOW,**
  - **TECHNICAL IMPLEMENTATION**

- **Types of Process Integration**
  - **POINT-TO-POINT**
  - **WORKFLOW**
  - **BUSINESS PROCESS AUTOMATION**
    - » *REQUIRES PROCESS ENGINE*
    - » *COMBINES MESSAGE BROKER, TPM, DIRECTORY, AND RESOURCE MANAGER FEATURES*

The Process-Centric Approach
PROS AND CONS

PROS

- ENABLES PROCESS ABSTRACTION
- RECOGNIZE MISALIGNMENT WITH BUSINESS
- CAPTURE BUSINESS REQUIREMENTS
- HIGH POTENTIAL

CONS

- UNFAMILIAR TO I.T.
- SHORTAGE OF EXPERTISE
- DEPENDS ON AVAILABILITY OF "ADAPTERS"
- EASY TO INTEGRATE INCONSISTENT PROCESSES
- IMMATURE: FEW TOOLS AND PROTOCOLS AVAILABLE

The Model-Driven Approach

Focus

– DRIVING AND MANAGING INTEGRATION FROM AN *INTEGRATION MODEL*

- **Key Integration Model Components**
  - *TECHNICAL ARCHITECTURE*: DETERMINES INFRASTRUCTURE
    - » MIDDLEWARE SUPPORTING THE *PROTOCOLS, INTERFACES, LANGUAGES, TRANSACTIONS*
  - *DATA MODELS*: THE BLUEPRINT FOR DATA INTEGRATION
    - » *INTEGRATE DATA AT CONCEPTUAL LEVEL AND DERIVE PHYSICAL FROM CONCEPTUAL*
  - *PROCESS MODELS*: THE BLUEPRINT FOR PROCESS INTEGRATION
    - » *BUSINESS PROCESS MODELS ENFORCE ALIGNMENT*
    - » *TECHNICAL PROCESS MODELS SPECIFY INFORMATION FLOW REQUIREMENTS AND LEAD TO DATA FLOW MODELS*
    - » *EVOLVING FROM STATIC TO DYNAMIC*

The Model-Driven Approach
PROS AND CONS

PROS

- PRECLUDES MISALIGNMENT WITH BUSINESS
- DYNAMIC CHANGE WITH BUSINESS REQUIREMENTS
- HIGHLY AGILE BUSINESS AND I.T.
- HIGH POTENTIAL
- RAPID, HIGH-VALUE RETURN

CONS

- REQUIRES BUSINESS MANAGEMENT LEVEL COMMITMENT
- REQUIRES RETHINKING BUSINESS/I.T. RELATIONSHIP
- UNFAMILIAR TO I.T. AND BUSINESS
- SHORTAGE OF EXPERTISE
- IMMATURE: FEW TOOLS AND PROTOCOLS AVAILABLE

Selecting The "Right" Approach
WHAT YOU DON'T KNOW WILL HURT YOU!

- **CONSIDER A MIDDLEWARE APPROACH WHEN…**
  - THE INFRASTRUCTURE NEEDS STRENGTHENING AND
  - LIMITED SCOPE WILL PROVIDE A HIGHLY VISIBLE BUSINESS BENEFIT

  OR
  - YOU CAN AFFORD A LONG DELIVERY AND BOTH DATA AND PROCESS INTEGRATION REQUIREMENTS ARE MINIMAL

- **CONSIDER A PROCESS-CENTRIC APPROACH WHEN…**
  - GOALS ARE LONG-TERM, GOALS ARE GENERAL, FLEXIBILITY IS KEY,

  OR RAPID, HIGH-VALUE RETURN IS NEEDED

- **CONSIDER A DATA-CENTRIC APPROACH WHEN...**
  - THE FOCUS IS ON BUSINESS INTELLIGENCE AND CONTROL

  OR
  - GOAL IS INTEGRATION OF EXISTING APPLICATIONS AND DATA SYNCHRONIZATION, CONSISTENCY, AND COSOLIDATION ARE KEY

Where We Are

✓ **Definition and Market**

    – **WHAT EAI IS**

✓ **Planning for EAI**

    – **BUSINESS AND TECHNOLOGY DRIVERS AND BENEFITS**

    – **KEY STEPS TO TAKE**

    – **ROLE OF APPLICATION SERVERS**

✓ **EAI Approaches**

    – **PROCESS, DATA, MIDDLEWARE, MODEL**

    – **HOW TO SELECT THE RIGHT ONE**

• **An I.T. Infrastructure for EAI**

    – **FUTURE OF EAI**

    – **ISSUES AND ADVICE**

PART IV

AN I.T. FRAMEWORK FOR ENTERPRISE APPLICATION INTEGRATION

Alternative Technologies

The Future of EAI

"… technology that provides a "workflow-like" coordination framework for process integrity at the business process level will become an integral part of these companies' technology infrastructure."

-- Delphi Group

- **Model-driven, Integrated Approaches**
    - INDEPENDENCE FROM TECHNOLOGY
    - MINIMIZE IMPACT OF CHANGE
    - PROCESS REQUIREMENTS DETERMINE DATA REQUIREMENTS
    - PROCESS AND DATA REQUIREMENTS DETERMINE MIDDLEWARE (INFRASTRUCTURE) REQUIREMENTS
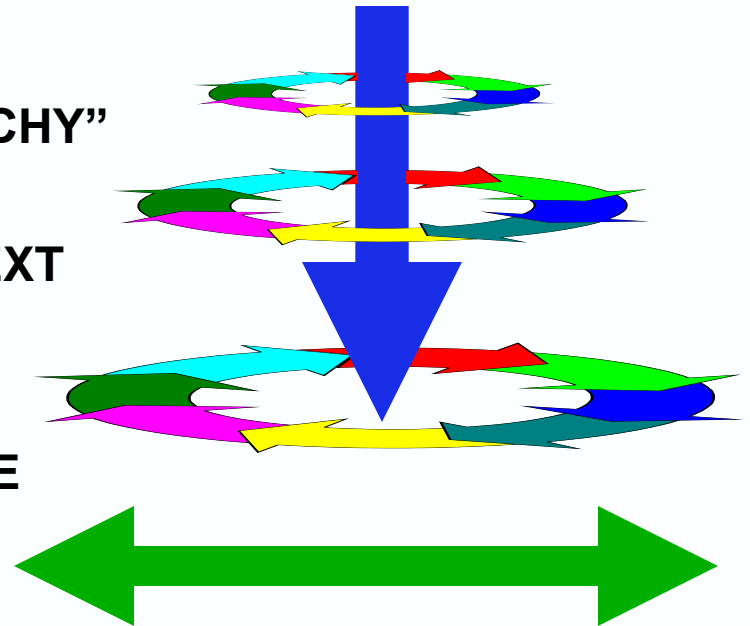
- **Introducing . . .**

"Zero Management"

*ZERO MANAGEMENT*tm
INTEGRATED APPROACHES

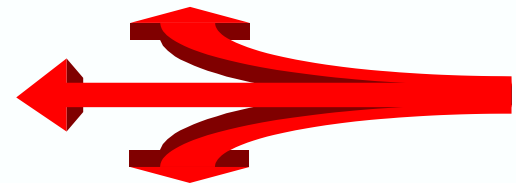- **Vertical Process Integration**
  - TOP DOWN MANAGEMENT "HIERARCHY"
  - PROCESS INDEPENDENCE
  - PROVIDES EVENT AND DATA CONTEXT
  - DYNAMIC CONTROL
  - I.T. OWNS TASK LEVEL PROCESSES
  - I.T. SUPPORTS PROCESS BACKBONE

- **Horizontal Data Integration**
  - ACTIVITY TO ACTIVITY
  - PROCESS ENGINE CONTROLS DATA TRANSFER
  - FACILITIES FOR REPLICATION, TRANSFORMATION, CLEANSING
  - BUSINESS TRANSACTION INTERFACES

- **Pervasive Middleware Enablement**

ZERO MANAGEMENT*tm*
EAI FRAMEWORK

EVENT TO EVENT PROCESS INTEGRATION

ENTERPRISE BUSINESS PROCESS MODELS
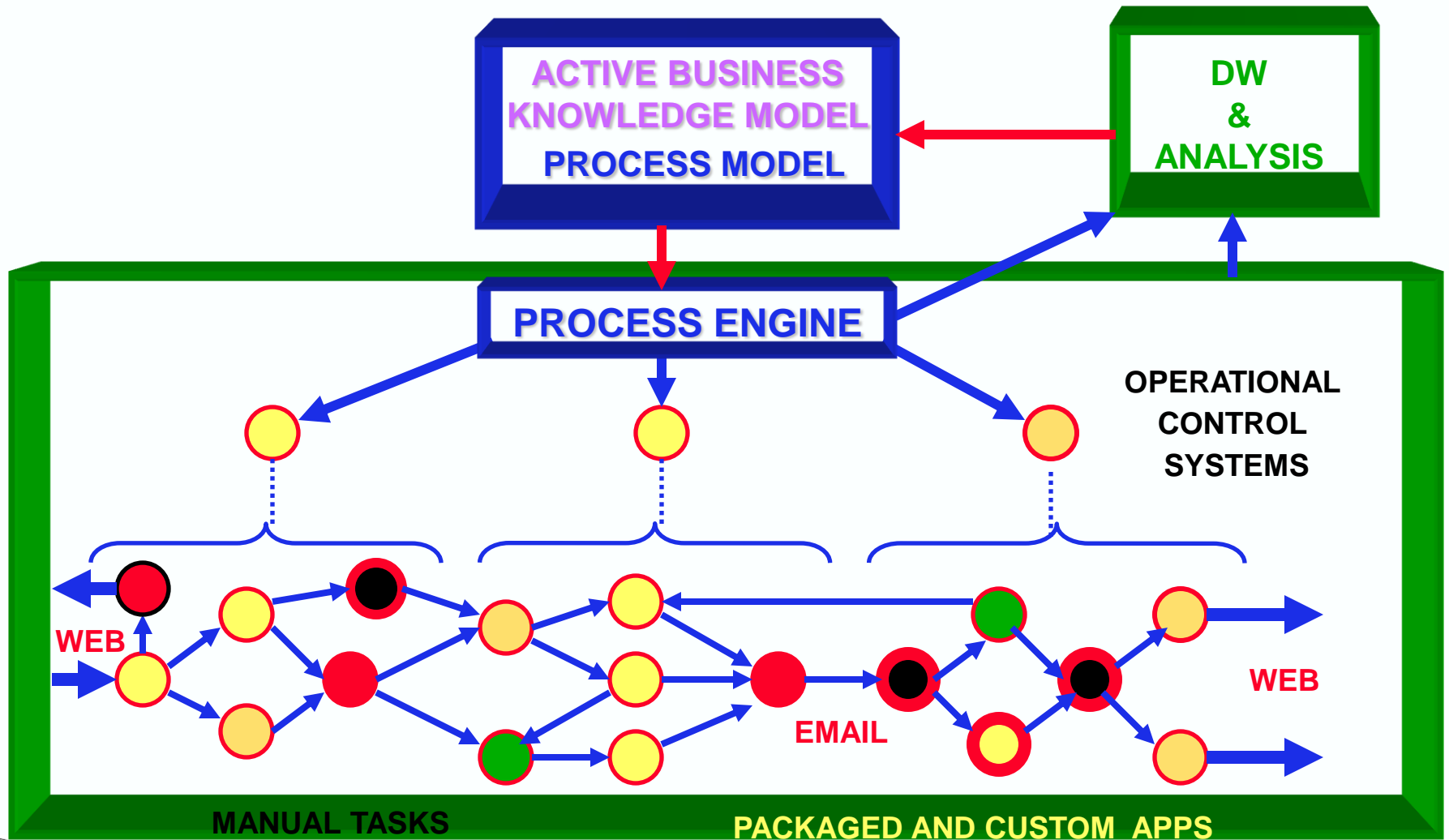
TASK TO TASK DATA INTEGRATION

ENTERPRISE CONCEPTUAL DATA MODELS

INTERFACE INTEGRATION MIDDLEWARE

ENTERPRISE TECHNICAL ARCHITECTURE

ZERO MANAGEMENT's
ENTERPRISE APPLICATION INTEGRATION

ACTIVE BUSINESS KNOWLEDGE MODEL

PROCESS MODEL

DW & ANALYSIS

PROCESS ENGINE

OPERATIONAL CONTROL SYSTEMS

WEB

WEB

EMAIL

MANUAL TASKS

PACKAGED AND CUSTOM APPS

Final Advice

- **Business Will Workaround I.T. If Necessary**

- **Aligning Business to I.T. is a <u>*Fatal Error*</u>.**

- **Don't Plan to Align Business and I.T. After the Fact!**

- **Identify the Drivers, Benefits, and Costs Up Front.**

- **Establish or Understand the Application Architecture**

- **Understand the Impact**

  - **PROCESSES, PERSONNEL, CUSTOMERS, AND SUPPLIERS**

- **Avoid DIsruption of Established Business Processes**

- **Let Models Drive the Effort**

Final Advice

- **Scope, Scope, Scope**

- **The Technical Process of Integrating Enables Re-Use**
  - OF EXISTING OR NEW APPLICATIONS AND COMPONENTS
  - 3X-5X RE-USE REQUIRED FOR COST RECOVERY*
  - 1.5X-3X MORE COSTLY TO CREATE REUSABLE COMPONENTS*
  - 4X MORE COSTLY TO CREATE A REUSABLE COMPONENT THAN TO USE AN EXISTING REUSABLE COMPONENT*
  - 2-3 PRODUCT CYCLES BEFORE BENEFITS OF REUSE ARE SIGNIFICANT*

- **Build in Scalability**

- **Instrument for Validation, Testing, and Monitoring**
  - PLAN FOR STRESS TESTING AND ON-GOING MONITORING
  - INTEGRATION ELEMENTS ARE NOT JUST GLUE!

* Cutler Information Corp.

Where We Are

✓ **Definition and Market**

   – **WHAT EAI IS**

✓ **Planning for EAI**

   – **BUSINESS AND TECHNOLOGY DRIVERS AND BENEFITS**

   – **KEY STEPS TO TAKE**

   – **ROLE OF APPLICATION SERVERS**

✓ **EAI Approaches**

   – **PROCESS, DATA, MIDDLEWARE, MODEL**

   – **HOW TO SELECT THE RIGHT ONE**

✓ **An I.T. Infrastructure for EAI**

   – **FUTURE OF EAI**

   – **ISSUES AND ADVICE**

Questions?

For more information on *Zero Management*, please check our Web site: *www.AlternativeTech.com*

Alternative Technologies

BIOGRAPHY

David McGoveran is an industry analyst, and an international management and technology consultant. He is president of Alternative Technologies (Boulder Creek, CA), specialists in solving difficult relational and distributed applications problems since 1981. He has authored numerous technical articles and co-authored several books (including those with Chris Date). His newest book is <u>The Zero Minute Manager: Business Success in the New Millennium.</u>

This seminar is based on his workshops: <u>The Client/Server University: Designing Effective Databases</u>, and <u>Achieving Scalability</u>

PLEASE FILL OUT YOUR EVALUATIONS...
Thank you!

Alternative Technologies

PART IV

AN INCOMPLETE GUIDE TO PRODUCTS

Alternative Technologies