Breakout Session

Exploring the Differences between Enterprise and System Architectures — A Look at the Different Methods, Tools, and Techniques

"New Age" Enterprise Architecting– Best Practices and Distinctions (to Solutions Architecting)
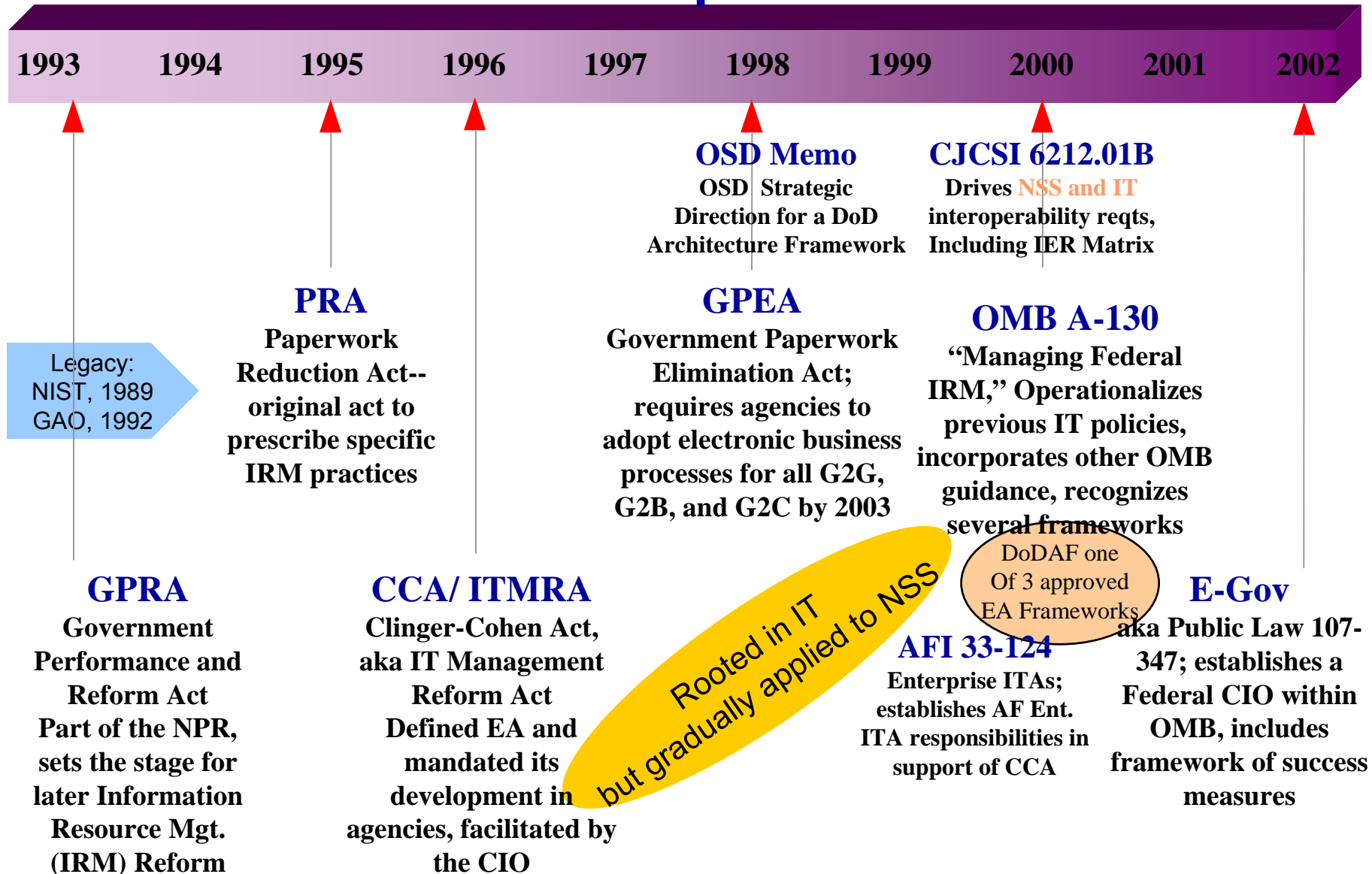
Jeff J. Diehl

Operational Requirements Directorate

Colorado Operations

GSAW2004
Ground System Architectures Workshop

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Focus Points

- **The intent, scope, and methods of enterprise architecting have expanded dramatically from the initial CCA guidance**

- **DoDAF is sufficient for what it was intended to do (standardize descriptions of solutions architectures), but other frameworks bring in additional facets that are necessary to fully realize the objectives of modern EA**

- **There is no "one size fits all" framework, tool, or process for doing EA**
  - The architect's challenge is finding and optimizing the right mix
  - The urban planning metaphor provides a useful companion to help us understand the relationship/ synergy between SA and EA

- **We should leverage EA best practices, lessons learned, and successful case studies as we lay out the vision, roadmap, principles, governance, etc. for our holistic EAs**

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Framework Lineage: IT/ Systems to NSS/ Enterprises

| 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |

OSD Memo
OSD Strategic Direction for a DoD Architecture Framework

CJCSI 6212.01B
Drives NSS and IT interoperability reqts, Including IER Matrix

PRA
Paperwork Reduction Act-- original act to prescribe specific IRM practices

Legacy: NIST, 1989 GAO, 1992

GPEA
Government Paperwork Elimination Act; requires agencies to adopt electronic business processes for all G2G, G2B, and G2C by 2003

OMB A-130
"Managing Federal IRM," Operationalizes previous IT policies, incorporates other OMB guidance, recognizes several frameworks

DoDAF one Of 3 approved EA Frameworks

Rooted in IT but gradually applied to NSS

GPRA
Government Performance and Reform Act Part of the NPR, sets the stage for later Information Resource Mgt. (IRM) Reform

CCA/ ITMRA
Clinger-Cohen Act, aka IT Management Reform Act Defined EA and mandated its development in agencies, facilitated by the CIO

AFI 33-124
Enterprise ITAs; establishes AF Ent. ITA responsibilities in support of CCA

E-Gov
aka Public Law 107-347; establishes a Federal CIO within OMB, includes framework of success measures

Evolution of EA Definition

"EA is the System!" John Zachman, father of frameworks

An architecture is "the structure of components, their relationships, and the Principles and guidelines governing their design and evolution over time."
C4ISR Architecture Framework, Version 2.0, derived from IEEE, circa 1998

Enterprise Architecting: Strategic information asset base, which defines the mission, the information and technologies necessary to perform the mission, and the transitional processes for … meeting changing mission needs"
Practical Guide to Federal EA, CIO Council, Nov 01

The Air Force Enterprise is comprised of all MAJCOMs, headquarters AF, agencies, installations, forces, and all operational mission and support activities those organizations perform. *AF Policy on Enterprise Architecting, CSAF/SECAF, 6 Aug 02*

… glue that holds the organization together … forcing function for quality strategic planning … enabler for transformation
(generalities from EA Conference, fall 03)

An Enterprise Architecture is the description of how an organization performs its work using people, business processes, data and technology
(OMB, 2003)

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Mapping DoDAF to EA Building Blocks

Enterprise Architecture Utility	Capability Needs & Priorities	Capability Maturity Strategy (Investment Strategy)	Systems Interoperability	Systems Consolidation & Integration	Process Reengineering	Mission Effectiveness

Architecture Building Codes & References

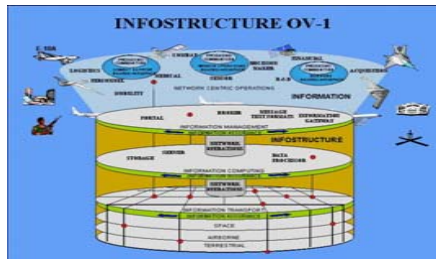| Missions	Business Processes & Functions	Capability Maturity	Interoperability	Integration & Infrastructure	Operating Environment	Implementation
Operational		Systems			Technical	

DoDAF

Architecture Methods

Training & Education	Procedures	Views, Representations & Linkages	Data & Detail	Architecture Description Tools	Architecture Databases	Architecture Analysis Tools
	Description Guidance					

Architecture Management

Oversight & Scorecarding	Tasking & Enforcement	Repository Maintenance & Access Provisioning	Enterprise Integration & Assessment

Architecture Policy

Requirements	Resourcing	Development & Procurement	O&M	Performance Measures Reporting	On-Demand Tasking to Address Priority Issues
	Systems Acquisition				

Reference: "Federal Enterprise Architecture Certification (FEAC) Institute," June 03

Key: FEA/F   DoDAF   All

Augmenting DoDAF for Enterprise Portfolio Management

- Performance/ Military Utility (Capability Views)

- Cost

- Risk

- Business case/ alignment

- Process synthesis

- Decision support/ visualization

- OMB Exhibit Requirements

- Project Management/ Reports

- Measures of success

- Others?

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Scoping Dimensions–
Enterprise and Solutions Architecting

EA   *SA*

Abstract	Detailed	System-Level Specificity

Broad	← Narrow	System Breadth

Abstract	Detailed	Business Process Specificity

Broad	← Narrow	Business Process Breadth

Abstract	Detailed	Organizational Specificity

Broad	← Narrow	Organizational Breadth

Abstract	Detailed	Technology Specificity

Broad	← Narrow	Technology Breadth

To Be	As Is	Level of Currency
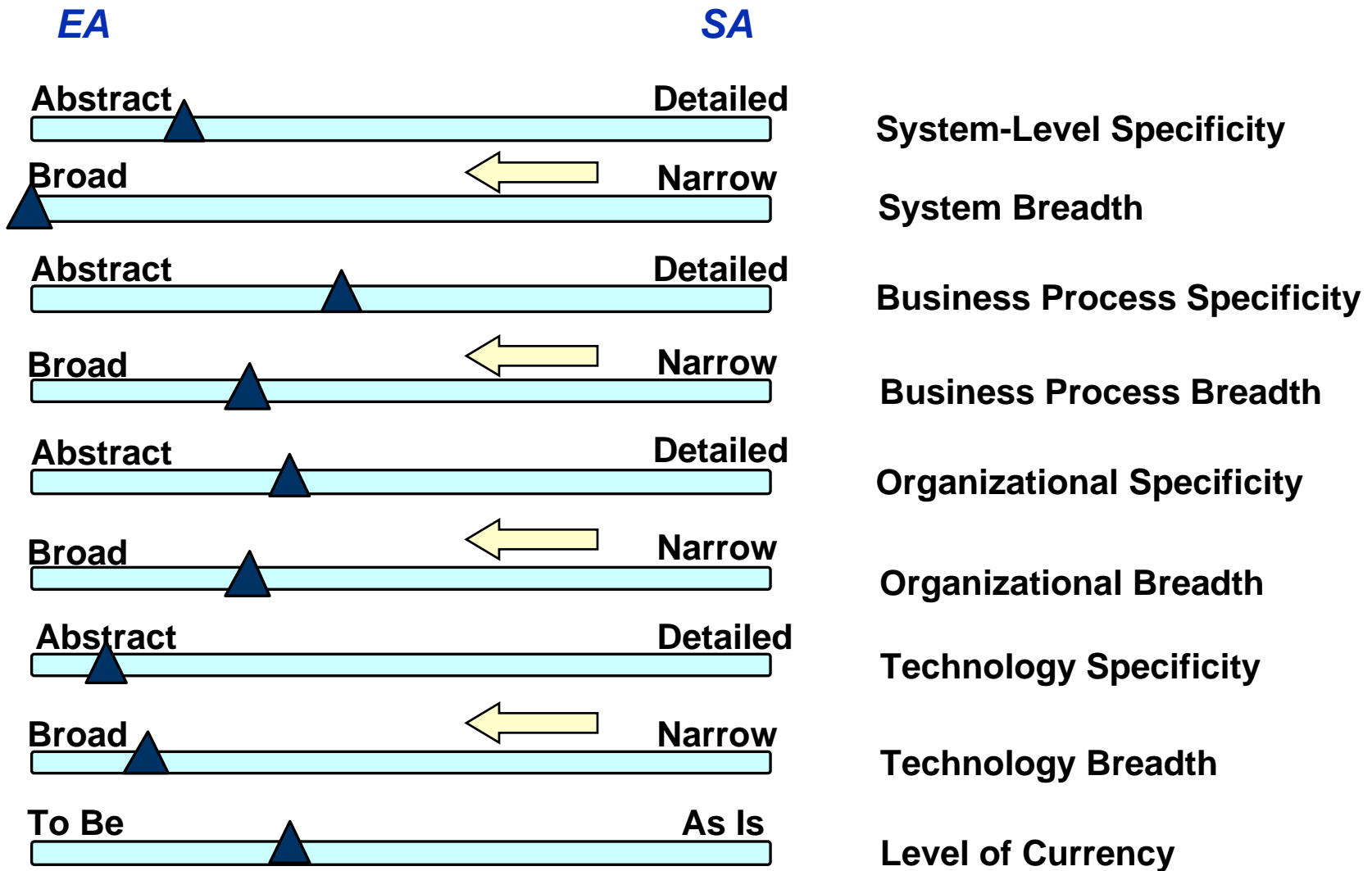
Reference: "Best Practices in Implementing Federal EAs," Patrick Bolton, Headstrong, June 25, 2003

New Age EA: as Defined by OMB

… high-level blueprint for *transforming* an organization

Federal organizations confront common challenges –

- Redundant processes, data and systems
- Out-dated, non-supported technologies
- Agency-specific, non-interoperable systems
- Rework and reentry of data
- No standardization across systems, technologies and processes

The result is –

- Wasteful, duplicative spending
- Inability take advantage of economies of scale
- Inability to define expected results (citizen, costs)

An Enterprise Architecture is the description of how an organization performs its work using people, business processes, data and technology

Attempting to modernize operations and systems without an enterprise architecture leads to –

- Operational and systems duplication
- Incompatible business operations, systems and data
- The inability to share data, or dependence on expensive, custom-made interfaces to permit data sharing

Reference: FEAC FEAF Fall '03, Bill McVay, DigitalNet, formerly w/ OMB

New Age EA Elements

- **Vision, Principles, Strategy, Roadmap**
- **Process synthesis/ optimization**
- **Framework and methods (rigor/ discipline)**
- **Collaborative Architecture Team**
- **Communication/ marketing**
- **Modeling and Repository Tools**
- **Information Assurance/Security**
- **Products and Services**
- **Measurement/ metrics (EAMM)**
- **Program Management Office (PMO)**
- **Decision support/ visualizations**
- **Portfolio/ change management**
- **Measurement/ metrics**
- **Threat analysis/ capability threads**
- **Gap, shortfall, and overlap assessments**
- **Cultural change enabler**
- **Cross-agency integration**
- **Component-based architecting**

Optimized/ Synchronized Processes

Common Services/
Component-based Architecture
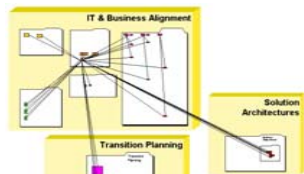
"Forcing Function" for
Strategic Planning-- Alignment
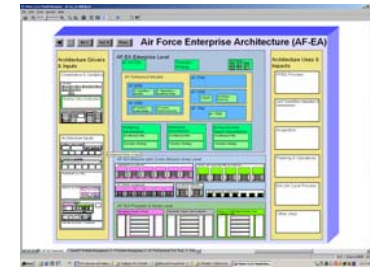
Decision Support
"Dashboards"—
Visualization
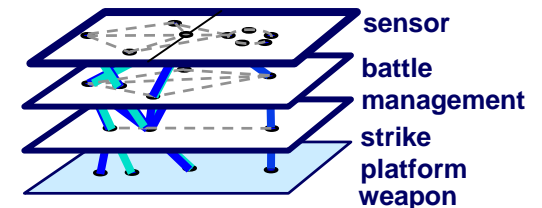
Capability threads, gap
Analysis, integration

Information Architecture:
Entities and Relationships

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Slide 9

Urban Planning Metaphor to Conceptualize "New Age" EA Scope

Chief Enterprise Architect

Urban Planner

PLANNING

Corporate Level CIO — High-Level Enterprise View

MAJCOM/ Functional Planner — Re-Engineered Business Processes

Mission/Functional Area Operators — Existing & Re-Engineered Business Processes

O & M

IT Operators/Maintainers — Existing & Planned System Information

ACQ

Engineers Programmers SPOs — Detailed Existing & Planned System Design

Air Force Enterprise Architecture (AF-EA)

INFOSTRUCTURE OV-1

OV Template
"Needline"
Node A
Activity 1
Activity 2
Node A
Node A Activity 3
Activity 2 Activity 3

Solution Architect

PLANNING AREA ASSIGNMENTS
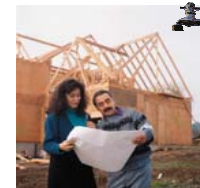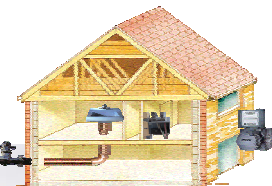
Building Architect

EA Best Practices

- **Collaborative culture/ community of practice/ High Performance Team tenets**
  - Relationships; e.g., architects and LOBs

- **Service- based organization/ function**

- **Create/ demonstrate value– elevator demo (e.g., visualization metamodel)**

- **Communicate, communicate, market, communicate …**

- **Repository/ web front end**

- **Governance**

- **Establish an EA PMO**

- **Process integration/ synthesis (especially CPIC/PPBE and planning)**
  - EA as forcing function for world class strategic planning

- **Principles and values**

- **Success criteria and measurement**
  - Consider OMB/ GAO EA Maturity Model Framework (EAMMF)

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EA Best Practices, continued

- **Driven by business questions**

- **Component-based architecting**
  - Common services/ applications usually best value opportunity

- **Tool integration**
  - EA tool/ model idea KM "engine"

- **Unbiased, objective, independent**

- **Know the technologies**

- **Proof of concepts and prototypes to mitigate risks**

- **Connect research with the EA**

- **Wring out ambiguity and non-value added steps**

- **Logic and Data model (do the tough work)**

- **Architecture review process**
  - Allow for waivers, with sunset clause

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Top 10 Reasons EAs Fail

- **Lack of success ownership**

- **Failure to demonstrate business value**

- **Failure to accurately identify stakeholders**

- **Seeing EA as a technical solution**

- **Poor communications**

- **Wrong people involved in the process**

- **Failure to see EA as a process**

- **Failure to integrate with other processes**

- **Too many people involved too soon**

- **Lack of funding**

Source: "Ten Steps for a Winning Architecture Program, DCI/Meta Group EAC, Jeff Scott, Logical Leap

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8 Steps to a Winning EA Program

- **Developing perspective**

- **(Avoid) Common mistakes**

- **Governance**

- **Marketing/ selling– ID customers, build partnerships**

- **Create business value**
  - 4 Attributes: relevant, reliable, rewarding, relative

- **Process integration**

- **Expanding influence**

- **Envisioning the future**

Source: "Ten Steps for a Winning Architecture Program, DCI/Meta Group EAC, Jeff Scott, Logical Leap

Deadly Sins of EA and the Results

- **Authority and control– focus on rules**
  - Active resistance

- **"It's all about the *right* technology"**
  - Religious wars

- **Advocate the corporate good– lofty goals, future goals**
  - Passive agreement

- **Architecture is taxonomy– models, frameworks, methods**
  - Passive resistance

- **Whining about resources**
  - Insincere sympathy

- **"Build it and they will come"– documentation, evangelism**
  - Polite apathy

- **Waiting for management support**
  - Superficial activity

Source: "Ten Steps for a Winning Architecture Program, DCI/Meta Group EAC, Jeff Scott, Logical Leap

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EA Lessons Learned

- **Organizational constraints kill architectural motivation and buy-in**

- **Roles quickly become politicized and personality-driven which impedes cooperation**

- **Keep users involved by aligning projects to the business**

- **Actionable progress and projects is a must with defined results**

- **Methodology must be pragmatic, flexibility is key (conversely, rigidity stifles)**
  - −the trade-off is the key to successful architecture implementations

- **Keep motivating and re-educating staff and management**
  - −especially since they change so frequently

- Governance is everything
  - −strong executive management involvement is essential

Source: FEAC FEAF, Fall '03, Pat Bolton, Headstrong

EA Lessons Learned, continued

- **Streamline Data Collection Process**
  - Build data collection templates
  - Import templates directly into tool
  - Predefine Framework work products

- **Integrate Security into EA Model Views**
  - Protect security vulnerability data in the EA model/ sub-models

- **Time-box Effort**
  - Keep it a short, iterative (phased) approach
  - Build in dynamic model updates to keep baseline changes updated in the model

- **Break Through Organizational Lines**
  - Treat data collection as an Outreach Program to the LOBs
  - Build in buy-in to the data collection process (educate first)
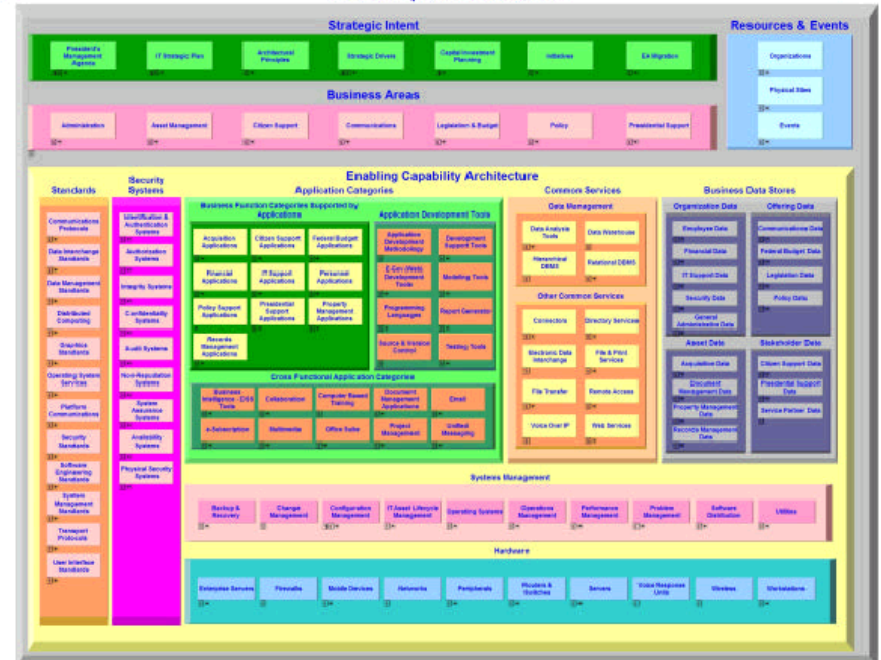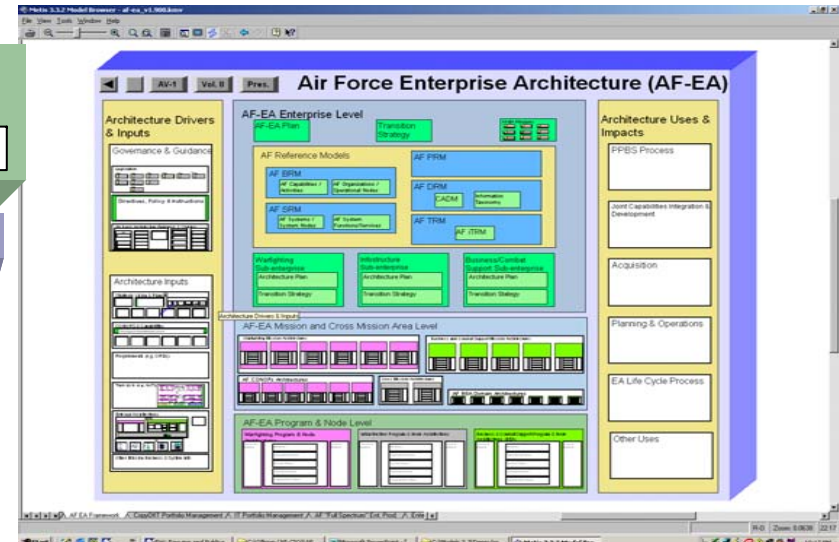 - Task force operations with weekly progress
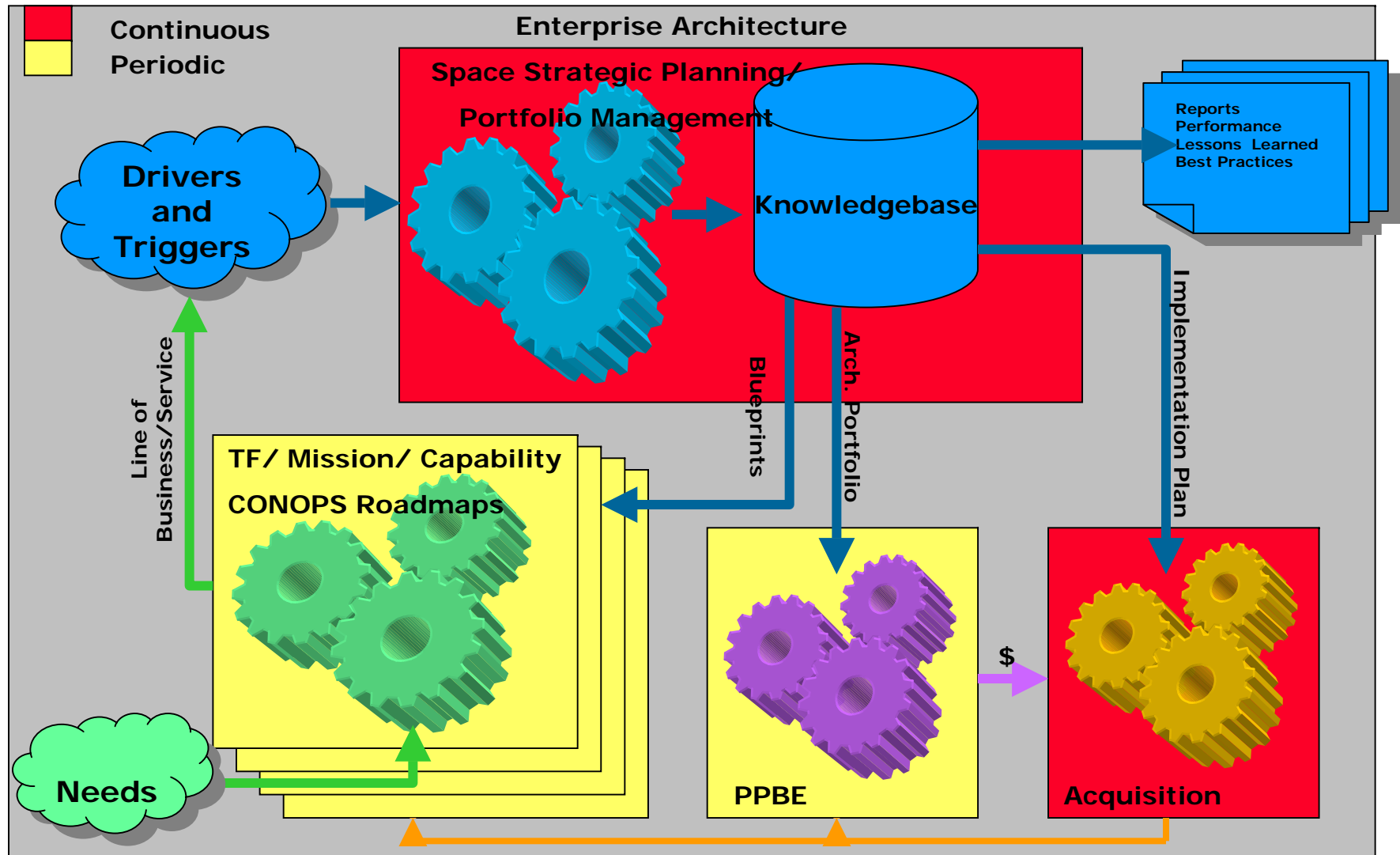
Source: FEAC FEAF, Fall '03, Pat Bolton, Headstrong

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Back-ups

EA Visualization/ Decision Support
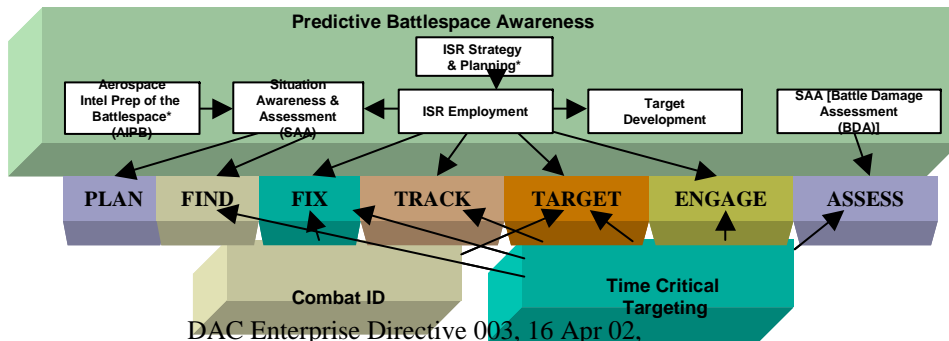
DAC Enterprise Directive 003, 16 Apr 02,
AF CIO Chief Architect Discussion Paper, draft, 10 Apr 03

http://www.btmg.biz/EA_SC/zach.htm

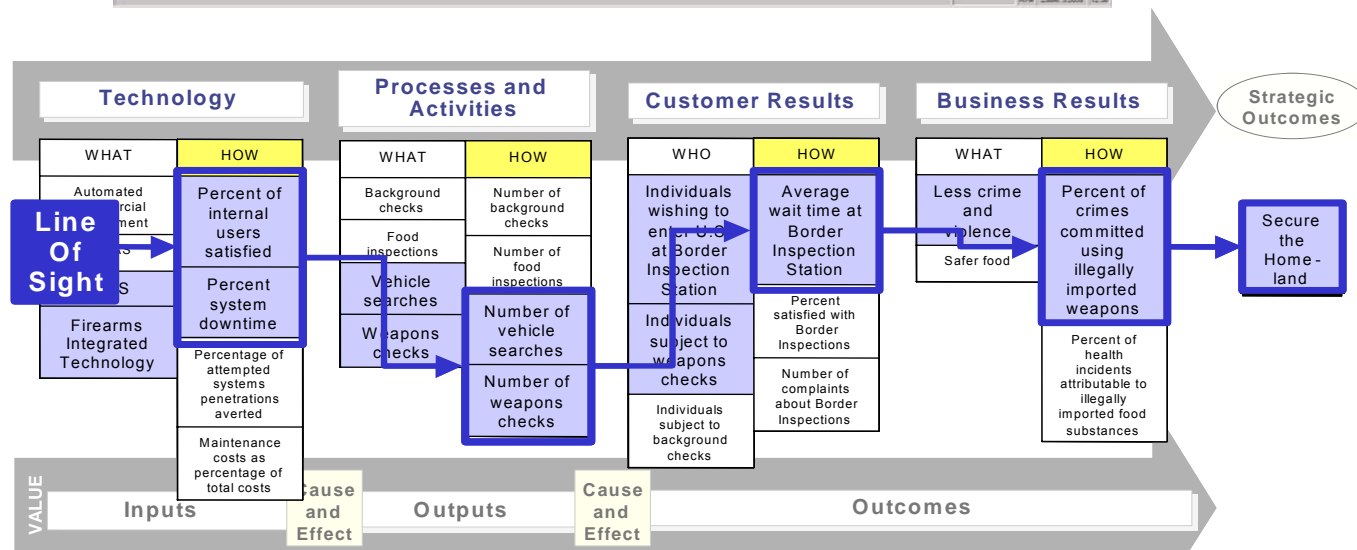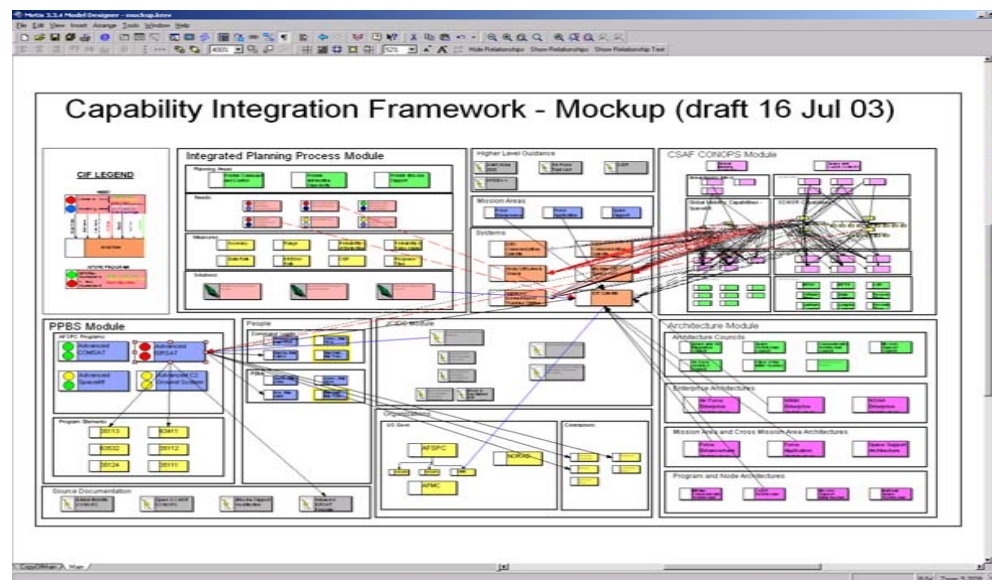Source: FEAC FEAF, Fall '03, Ira Sachs, EOB Slide 19

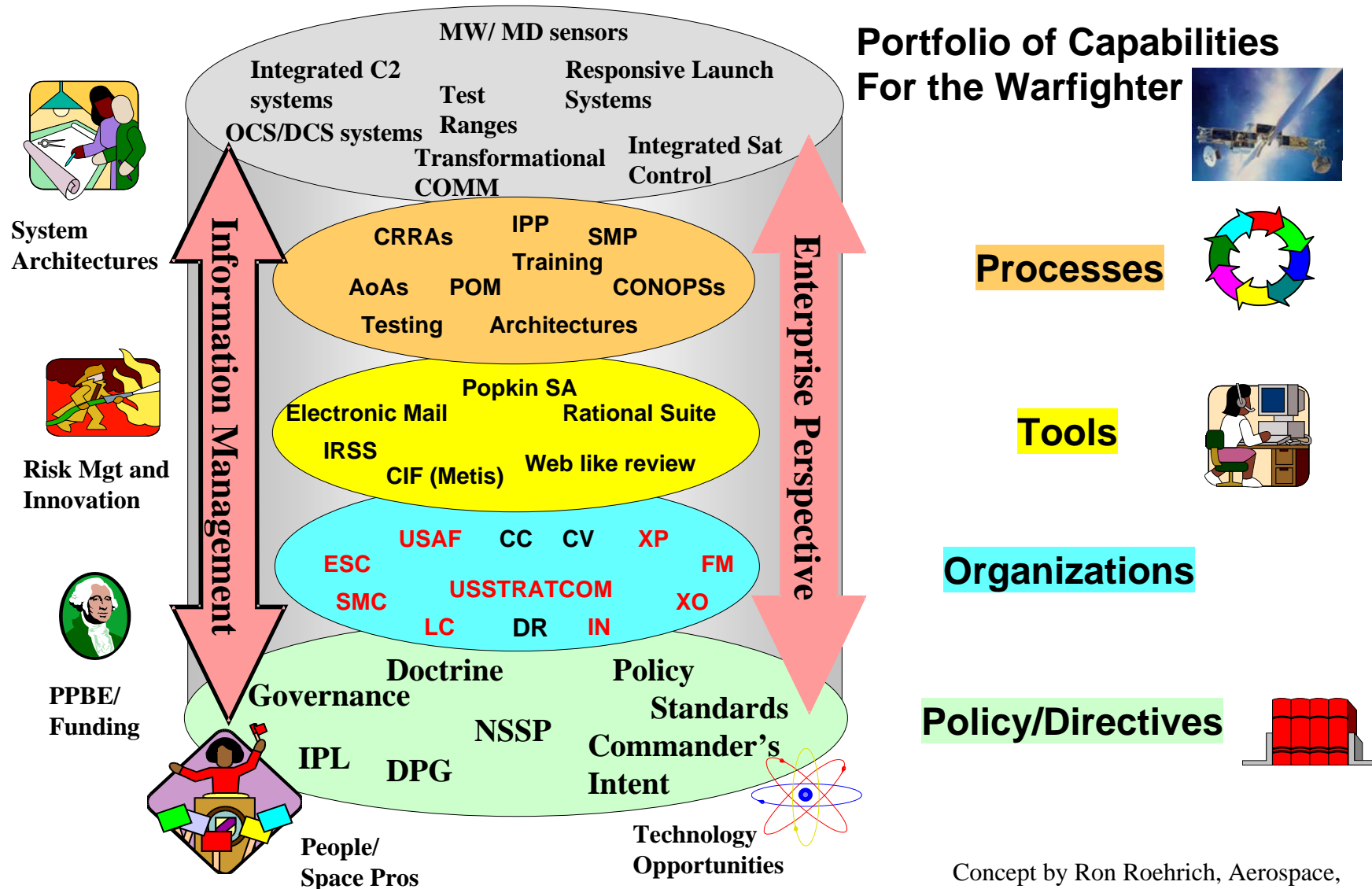# Process Synthesis/ Optimization w/ EA

Reference: "Modernizing HUD's IT Lifecycle," E-Gov Conference, Oct 03, Graham Barrowman

EA for Alignment and Performance Models

From: "FEA Implementation and Integration, M. Tiemann, FEAC, FEAF, Fall 03"

EA as Multi-Dimensional Integration Enabler

Portfolio of Capabilities For the Warfighter

System Architectures

Risk Mgt and Innovation

PPBE/ Funding

Information Management

Enterprise Perspective

MW/ MD sensors
Integrated C2 systems
Responsive Launch Systems
Test Ranges
OCS/DCS systems
Transformational COMM
Integrated Sat Control

CRRAs IPP SMP
Training
AoAs POM CONOPSs
Testing Architectures

Popkin SA
Electronic Mail Rational Suite
IRSS
CIF (Metis) Web like review

USAF CC CV XP
ESC FM
SMC USSTRATCOM XO
LC DR IN

Doctrine Policy
Governance Standards
NSSP Commander's Intent
IPL DPG

Processes

Tools

Organizations

Policy/Directives

People/ Space Pros

Technology Opportunities

Concept by Ron Roehrich, Aerospace, AFSPC/DR SEIO, Jan 04

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Work Culture Transformation via EA

- **"Our <u>desired</u> or ideal culture would reward, encourage and support the following behaviors and activities:"**

Organization Attributes
♦ Experimenting with new ways of operating
♦ Continuously improving operations
♦ Pioneering new ways of doing things
♦ Capitalizing on creativity and innovation
♦ Anticipating change in operating environment
♦ Establishing new procedures, systems and methods of operation

People Attributes
♦ Being flexible and adaptive in thinking and approach
♦ Attracting top talent
♦ Encouraging teamwork*
♦ Providing employees with resources to do the job
♦ Rewarding superior performance
♦ Taking initiative*

* also seen as a priority in the current culture

- **Linear thinking to innovation**
- **Authority and control to influence**
- **Technology to business**
- **Models and methodology to products and services**
- **Activity management to delivering value**
- **Budgets to investments**
- **Risk avoidance to risk management**

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