



Whitney, Bradley & Brown, Inc.

*Helping Our Clients Make Better Decisions*



# ***Integrated DoD/C4ISR Architectures – It's Not About The Framework...***

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# *Integrated Architectures – It's Not About the Framework*

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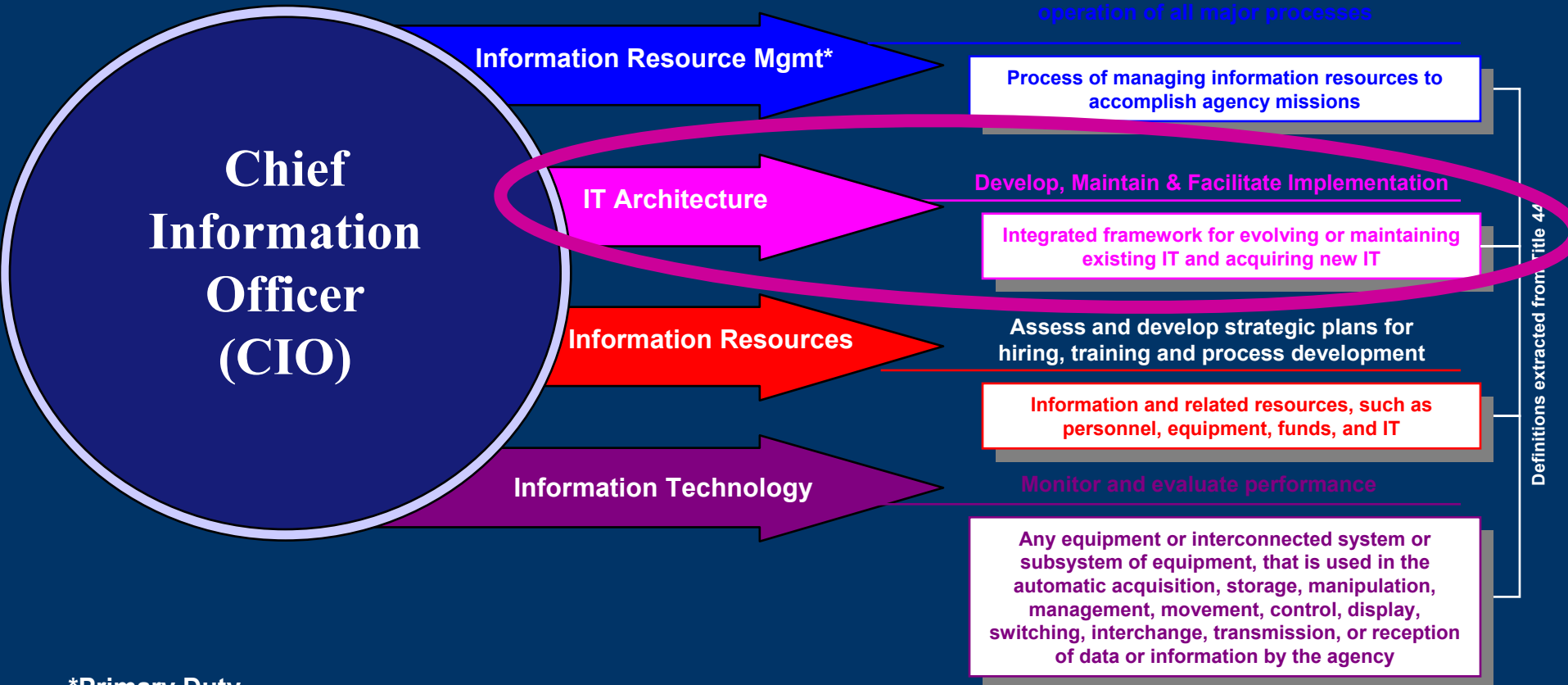
## Overview

- **DoD/C4ISR Architecture Background**
- **Part of the Answer: JCIDS Process**
- **JCIDS-Driven Analysis Requirements**
- **Endgame Recommendation**



# DoD/C4ISR Architecture Background

## Clinger Cohen Act of 1996: CIO Responsibilities & Duties



\*Primary Duty

# DoD/C4ISR Architecture Background

## Architecture Definitions/Tenets

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- **C4ISR/DoD Arch Framework:** “...*The structure of components, their relationships, and the principles & guidelines governing their design & evolution over time...*”
- **Federal CIO Council:**
  - “... a **strategic information asset base**, which defines the mission, the information necessary to perform the mission and the technologies necessary to perform the mission, and the transitional processes for implementing new technologies in response to the changing mission needs...”
  - “...*The primary purpose of an EA is to **inform, guide, and constrain** the decisions for the enterprise, especially those related to IT investments...*”



# DoD/C4ISR Architecture Background

We've Been Doing This Since 1996...

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**NO!!**

# DoD/C4ISR Architecture Background


Are We There Yet... Why Not...?

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- CIO's chartered to build architectures; but... it was an “unfunded mandate...”
- CIO's spent years “doing architectures...”
  - “As Is” architectures were documenting a “moving target...” most efforts never completed
  - Viable “To Be” architectures seldom “gotten to”
- Drove “Management Question...:”
  - How best to capture architecture artifacts from new programs?
  - Answer: Make them document architectures as part of acquisition process (ORD and C4ISP)
  - But... there was no requirement to tie program architectures to CIO's Enterprise Arch or DoD Data Standardization efforts

# DoD/C4ISR Architecture Background

Are We There Yet... Why Not...?

- **How C4ISP's C4ISR Architecture Product Requirements Generally Accomplished:**
  - OV-1, OV-2, SV-1, OV-6c:  
SME/Graphic Artist PowerPoint/Drawing Tool Engineering...
  - OV-3/SV-6, TV-1:  
SME/Engineer-developed Excel Spreadsheets...
- **Usually NOT tied to the community CIO's enterprise architecture, so information captured:**
  - Fell on the floor...
  - Couldn't be tied to requirements...
  - Couldn't be analyzed on an enterprise level...
-  **Was determined by whether or not the views "looked like" a C4ISR Arch Framework product, rather than whether it "answered the mail" with respect to the requirement delineated in an Integrated Architecture**

**WRT to Clinger-Cohen, the process didn't "answer the mail..."**

# Architecture Background

Joint C4I Interoperability...



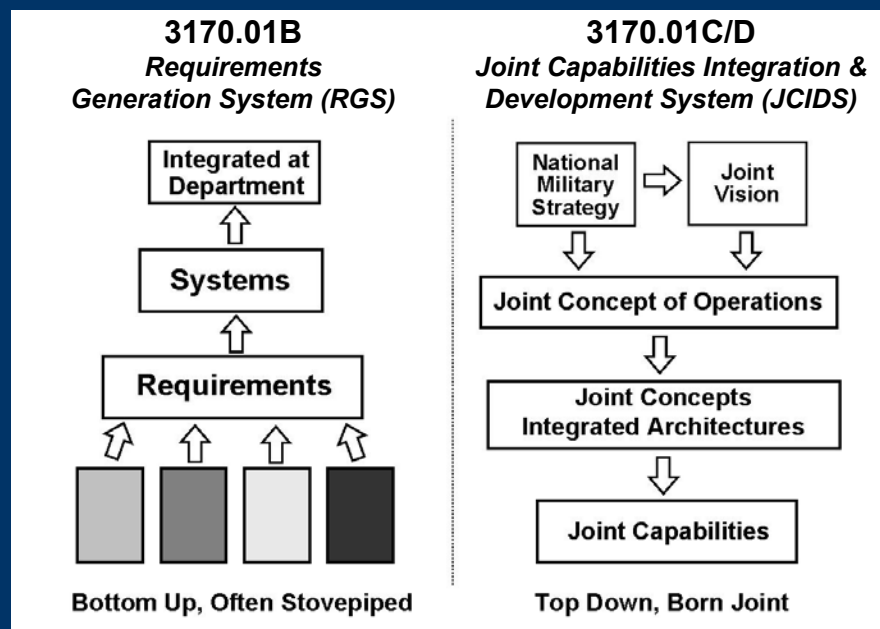




# Part of “The Answer...”

## Joint Capabilities Integration and Development Process (JCIDS):

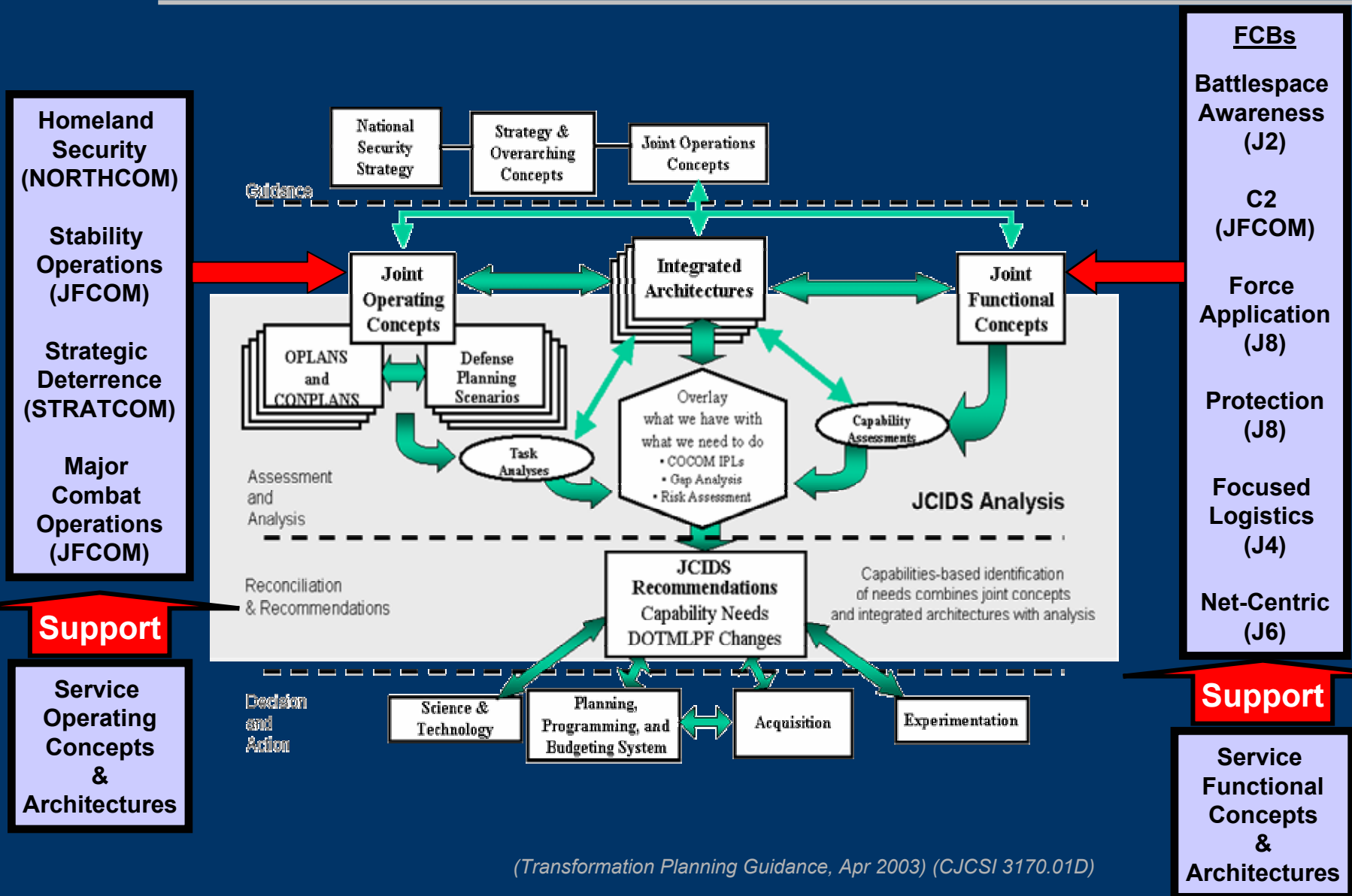
- **Transition Period:**  
RGS (CRD/MNS/ORD) =>  
JCIDS (Int Arch/ICD/CDD)
- **Why Change:**
  - Historically, RGS process has been good at systems engineering “within the stovepipe”
  - However, RGS has been “not so good” at enterprise-wide requirements management
- **Integrated Architectures:**
  - Provide engineering discipline to design of the Enterprise:
    - Business Processes + Systems + Rules by which systems built...
    - Constraint: that which one has financial control/influence over
  - “Net Centric” transformation enabler: “raises the bar” on what the system is:



The Network IS the System...

# Part of "The Answer..."

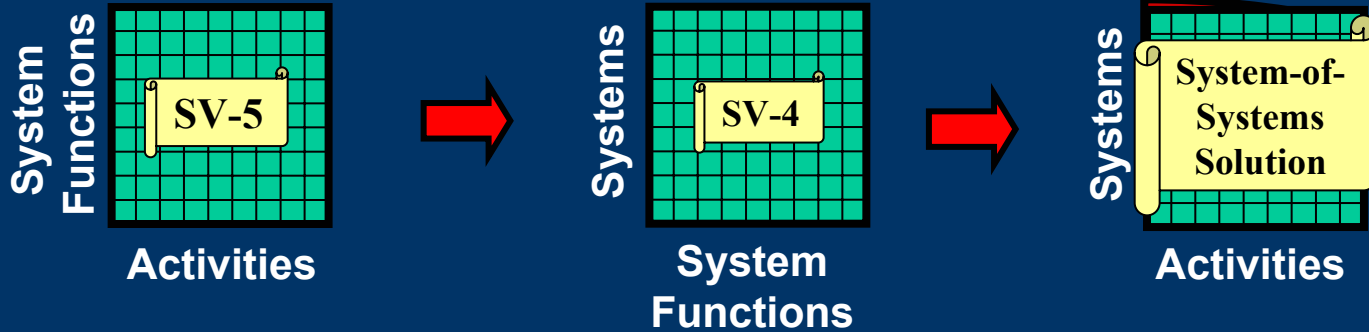
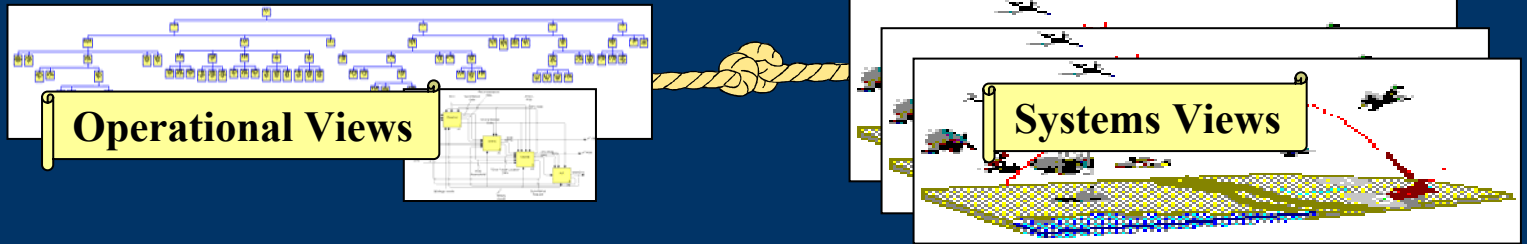
## Joint Capabilities Integration and Development Process (JCIDS):





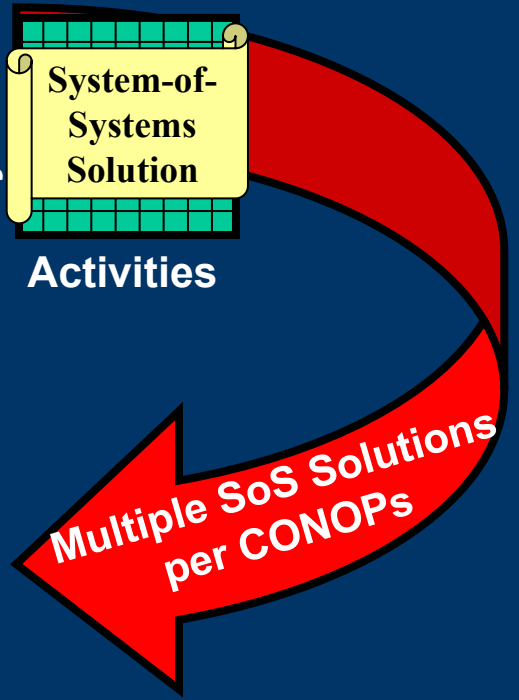
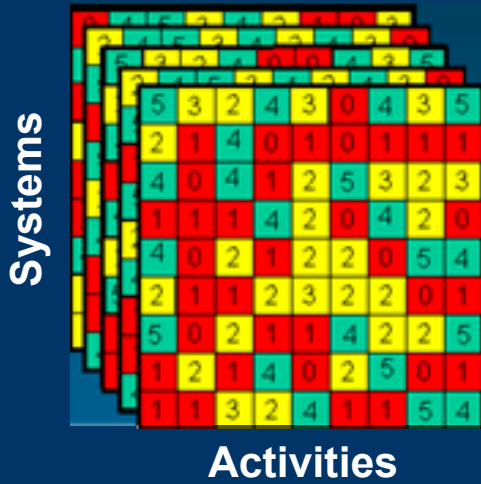
# JCIDS-Driven Analysis Requirements

## Joint Capabilities Analysis



**Time-Ordered Capability = Grouping of Activities**

**System of Systems = Roles + Systems (defined by KSAs) (Hardware/Software)**





# JCIDS-Driven Analysis Requirements

## Enterprise-Wide Capabilities Analysis



Scenario #1



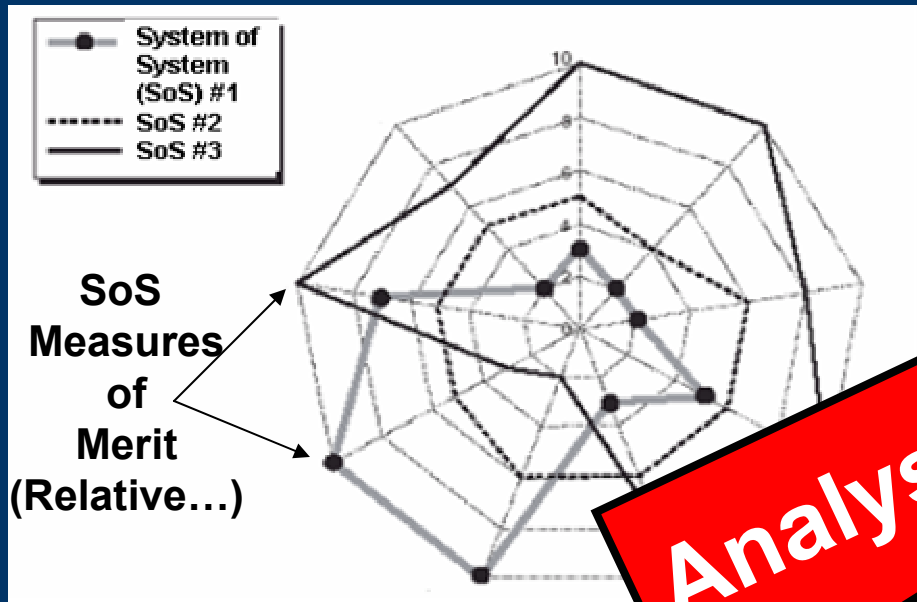
Scenario #2



Scenario #3...



Scenario #n



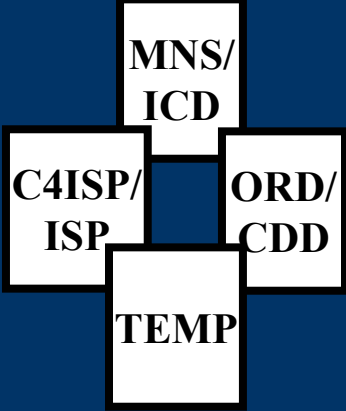
**Analysis**

Decision Analysis/  
Portfolio Management

Operations Analysis/  
Modeling & Simulation

**Chosen**  
**SoS Solutions**

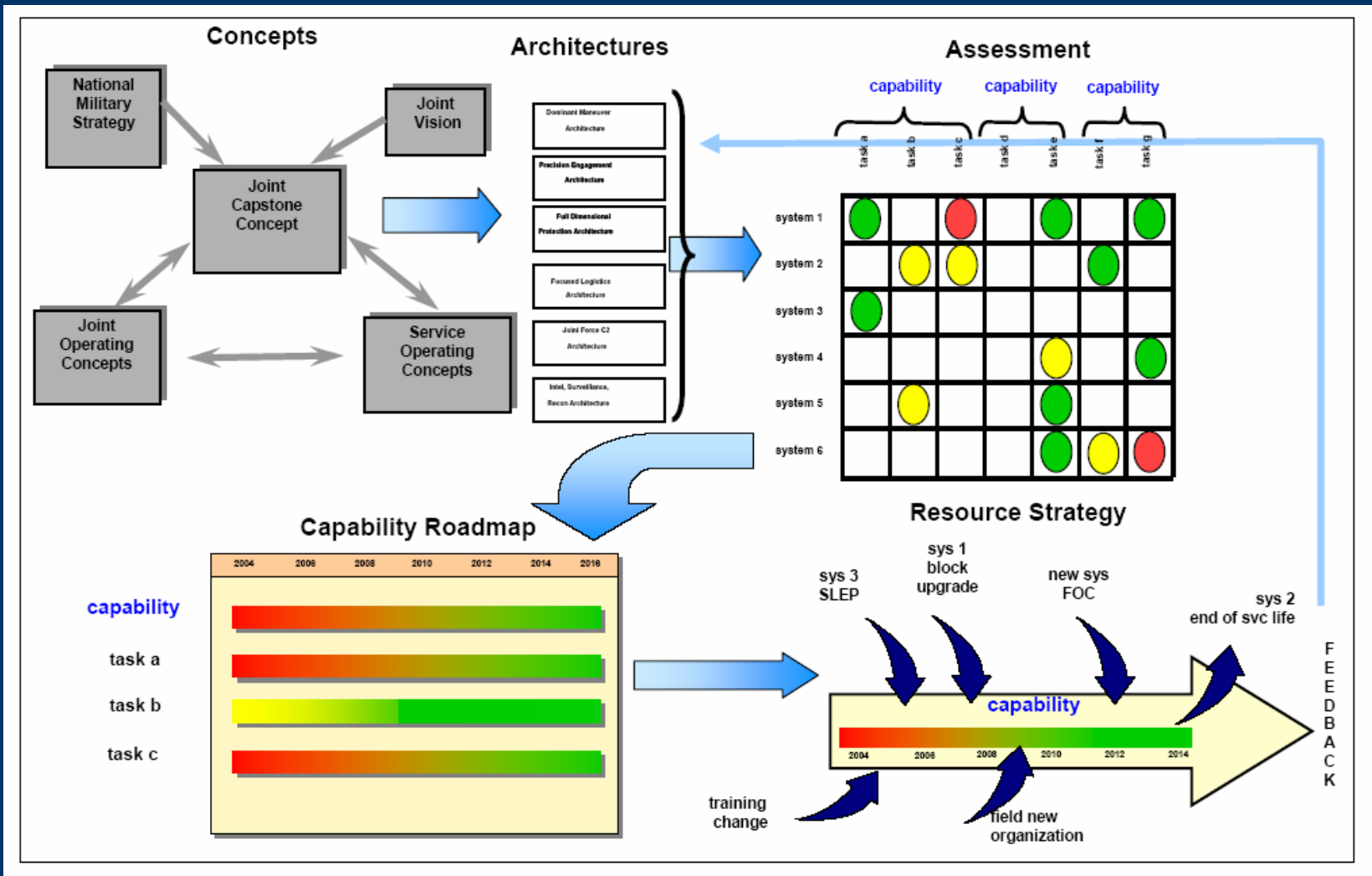
**Acquisition**



- Analyze SoS's across ALL applicable scenarios within the Enterprise
- Enterprise Examples:
  - ✓ Navy: Mission Capability Packages
  - ✓ AF: AF CONOPs (Global Strike, Global Response, etc.)
  - ✓ Joint: Joint Operational Concepts/ Joint Functional Concepts
- Potential Analysis Threads:
  - ✓ Systems coverage across scope of Activities
  - ✓ Min acceptable solutions



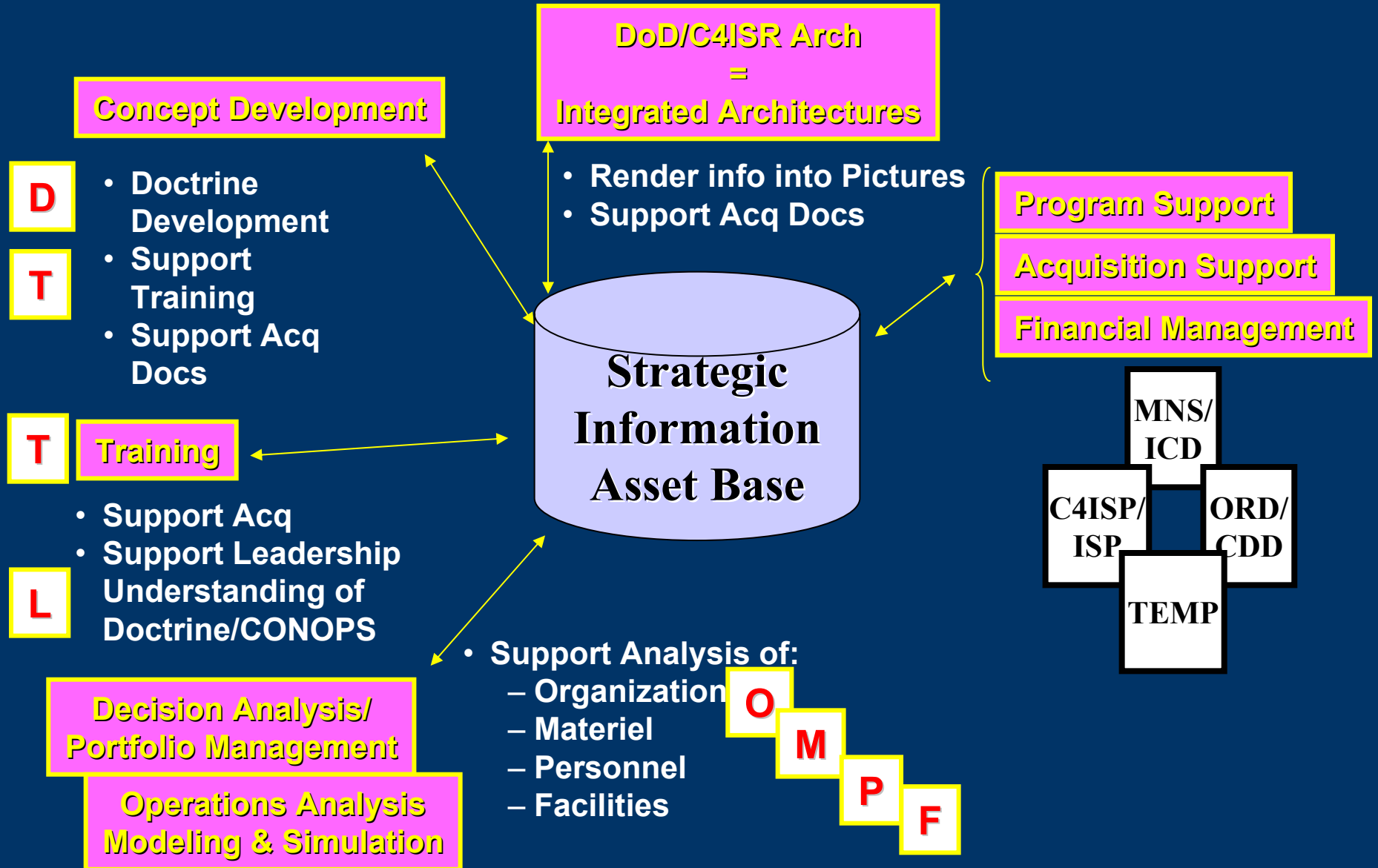
# JCIDS-Driven Analysis Requirements Gap Analysis





# JCIDS-Driven Analysis Requirements

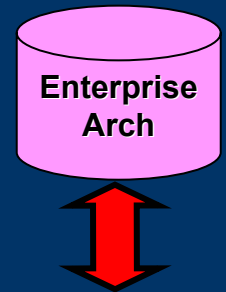
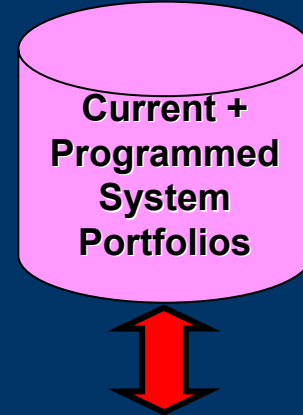
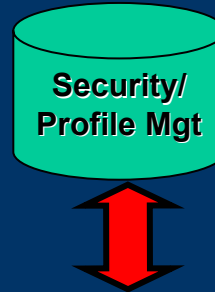
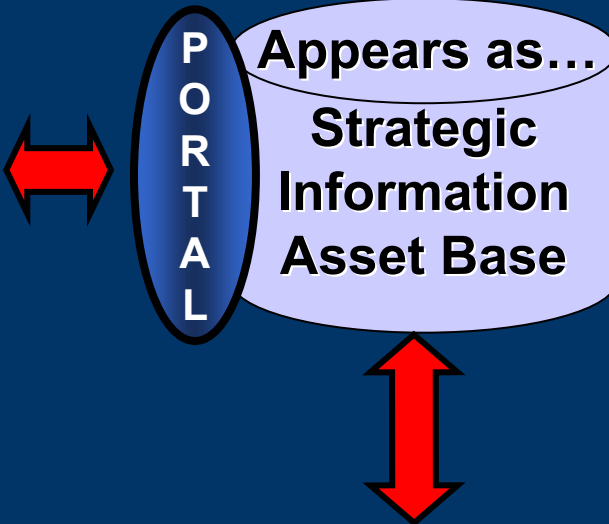
Enterprise-Wide Capabilities Analysis: Span DOTMLPF...



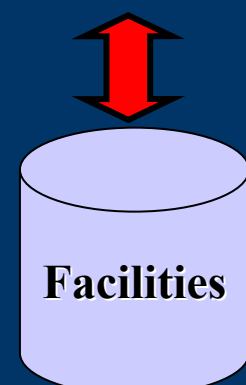
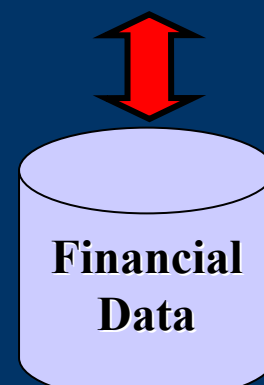
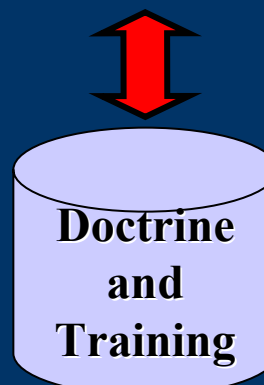
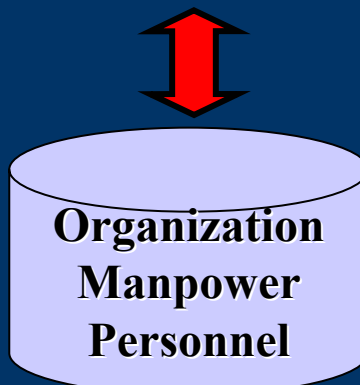
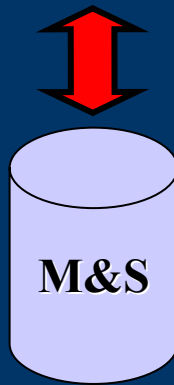
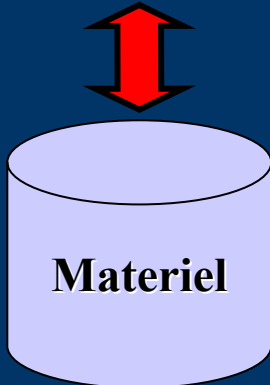


# JCIDS-Driven Analysis Requirements

Implication: Need Near-Real Time Total Asset Visibility



GIG NCES Mediation Services



Need Near Real-Time Asset Visibility to Manage ALL Aspects of DOTMLPF, with ties to Financial and M&S



# Endgame Recommendation

## Tie Portfolio Management to Integrated Architectures

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- **What is Portfolio Management?**
  - **Software-supported management information system for program, asset, and activity management**
    - **Web based system for dynamic updating**
    - **Robust technology for managing any type of corporate asset**
    - **Leverages existing automated data collection systems**
    - **Views are customized for each level of management oversight**
- **Standardizes reporting across the organization**
  - **Reduces level of effort and turn-around time for status updates**
  - **Minimizes the need for ad hoc reports**
- **Tracks performance metrics in near real time**
  - **Tracking indicators highlight problems for rapid diagnosis and resolution**
  - **Collects performance histories over time (trend analysis)**
  - **Tracks ownership and status of deliverables**
  - **Visual status prompts pinpoint high value/high impact issues for risk mitigation**





# Endgame Recommendation

## Tie Portfolio Management to Integrated Architectures

Choose

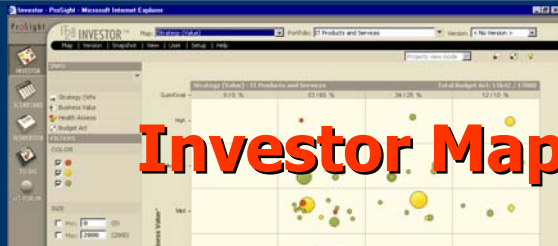
Annual Plan

Business Focus

Group/  
Program Focus

Team/  
Project Focus

Execute

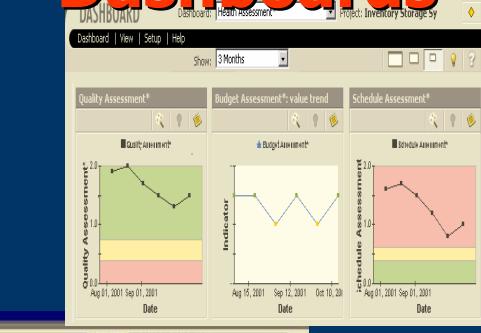


Investor Map



Dashboards

Scorecard



Workbook

All Views User Profile-based: User profile determined by role; user only sees information appropriate to their role



# Endgame Recommendation

## Tie Portfolio Management to Integrated Architectures

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- **Recent Positive Developments:**
  - **GIG Net Centric Enterprise Services Core Enterprise Services definitions are maturing, and can possibly be leveraged for mediation services and/or IA/Security Services**
  - **Recent/Draft Documents/Guidance:**
    - **OSD 03246-04, 22 Mar 04**
      - ✓ **Subject: Information Technology Portfolio Management**
      - ✓ *...While the guidance specifically addresses IT portfolios and a process for making tradeoffs among IT projects, the IT portfolio is part of the Departments broader portfolio of investments...*
    - **DoD Management Initiative Decision 918 (DRAFT)**
      - ✓ **Subject: Establishing Portfolio Governance for the Global Information Grid (GIG)**
      - ✓ *...ensures that the Department's Information Technology (IT), including National Security Systems (NSS), investments in information capabilities and services are managed as portfolios...*



# Endgame Recommendation

## Tie Portfolio Management to Integrated Architectures

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- **Positive Developments Since Paper was Written (cont.):**
  - **Recent/Draft Documents/Guidance (cont.)**
    - **DoD Business Modernization and Systems Integration Office requested Industry Advisory Council's Enterprise Architecture Special Interest Group to develop whitepaper:**
      - ✓ **Subject: Integrating Enterprise Architecture and Portfolio Management Within BMSI (Domains: Acct & Fin, Acq, HRM, Inst & Env, Log, Strat Plan & Budgeting)**
      - ✓ **To be published soon...**
    - **Observation: these documents primarily deal with IT ONLY. Remember we need to manage ALL aspects of DOTMLPF... plus schedule... plus finances... and tie it to M&S...**
- **Endgame Recommendation:**
  - **Tie Enterprise Architectures to Portfolio Management**
  - **Leverage GIG NCES CES as Much As Possible**
  - **Do proof-of-concept at JFCOM, SOCOM, or TRANSCOM to prove Joint viability**
  - **Benefits:**
    - **NRT Asset Visibility aids in monitoring progress from as-is to to-be**
    - **Analysis of Program Slips, "what if's", etc. greatly facilitated**
    - **Key start towards Net Centric Warfare...**



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# Questions?

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# BACKUPS...



# Corporate Profile

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- **Website:** [www.wbbinc.com](http://www.wbbinc.com)
- **Client Base:**
  - U.S. Departments of Defense, Transportation
  - UK, Australian, Italian and German Ministries of Defense
  - US and Allied defense-related businesses
  - Non-defense corporations
- **Contracting Vehicles:**
  - Government Services Administration (GSA) (MOBIS Schedule)
  - Sub-contract to Coalescent Technologies Corporation (CTC)
  - Direct Contract
- **Founded: 1981**
- **Ownership: Employee-owned**
- **2003 Revenues: > \$23 Million**
- **Employees: 100+**
- **Locations:**
  - Vienna, VA
  - Hampton, VA



# WBB Core Competencies

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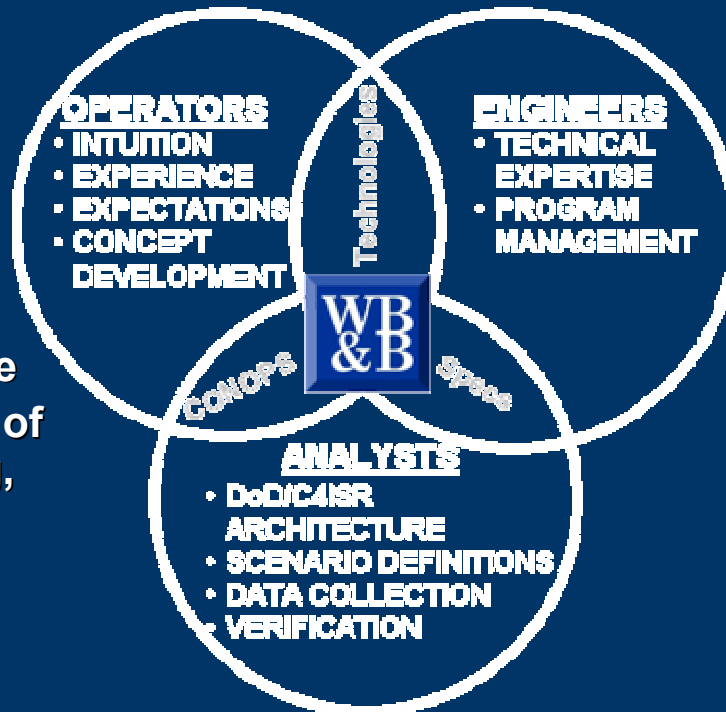
- **Core Competencies:**
  - Concept Development
  - Operations Analysis
  - Program/Financial/  
Acquisition/JCIDS  
Support
  - DoD/C4ISR Architecture  
Development
  - Decision  
Support/Portfolio Mgt
  - Training
- **Additional Strengths:**
  - Battlespace Knowledge
  - We Know the Players
    - DoD and other Government Agencies

We help our clients improve their  
operational and business performance

# What WBB Brings to Bear

## Senior Warfighters from All Services

- Current operations, logistics, and acquisition expertise
- Detailed knowledge of the decision making, procurement, and budget processes



## Experienced Military Engineers

- Operational Military and Prime Contractor design experience
- Seasoned Program Managers of large weapons systems and programs

## Experienced Military Operations Research Analysts

- Senior Operations Research Analysts, with appropriate core models and tools
- JCIDS + DoD/C4ISR Arch subject matter expertise

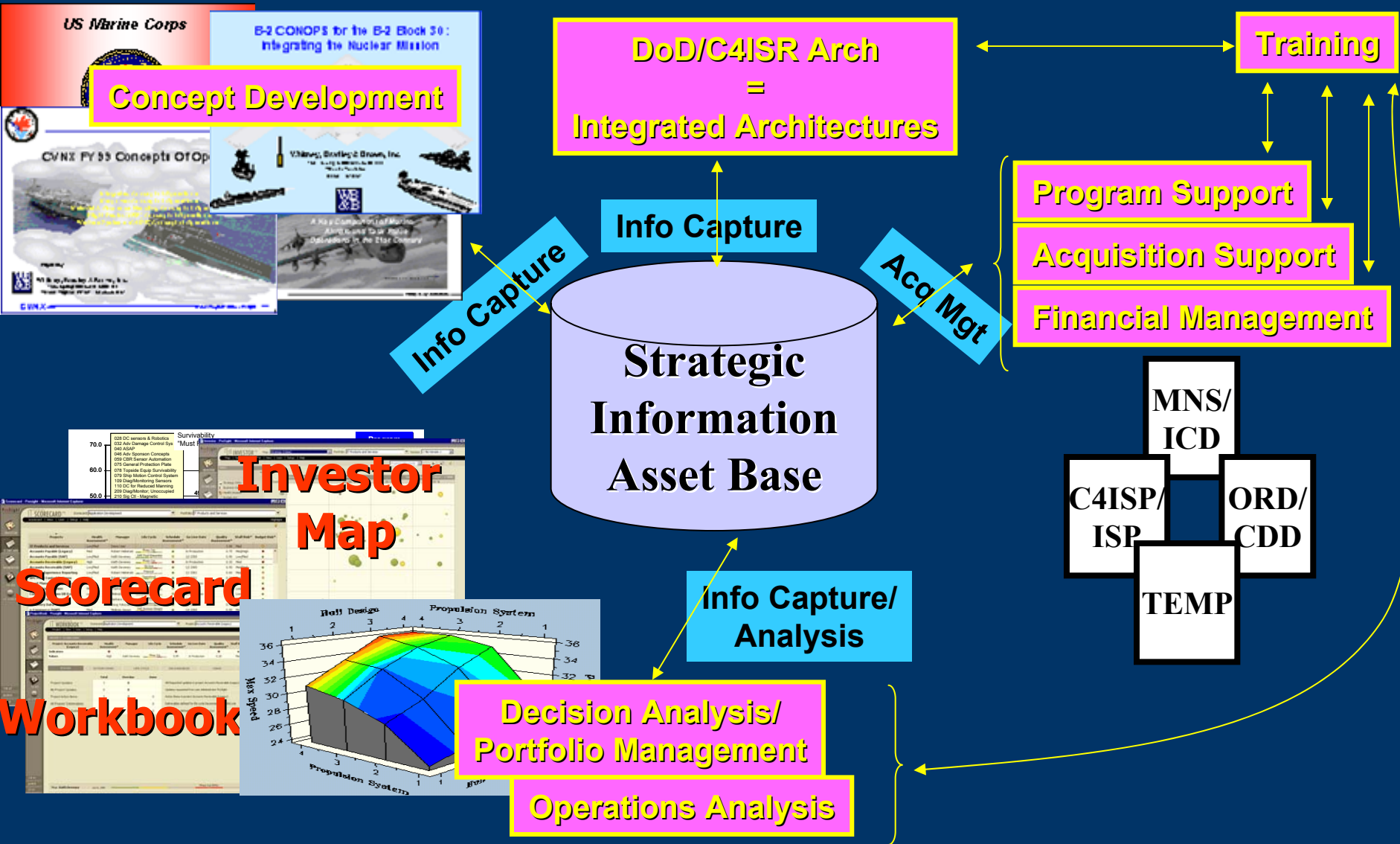
Proven ability to identify issues, perform analysis appropriate to the problem space, and provide viable solutions





# So What?

Implications: How WBB can help connect the Dots...



# Concept Development

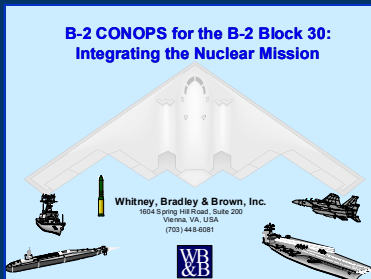
ConOps forms the foundation for requirements development, systems analysis and integration:

- Operationalizes new technologies, future concepts
- Clarifies emerging requirements
- Establishes a Joint perspective
- Identifies issues requiring resolution
- Achieves consensus among
  - Warfighters
  - Requirements and acquisition communities
  - System developers
- Gains broad support for new and ongoing programs

ConOps development has been at the core of WBB business for over 10 years

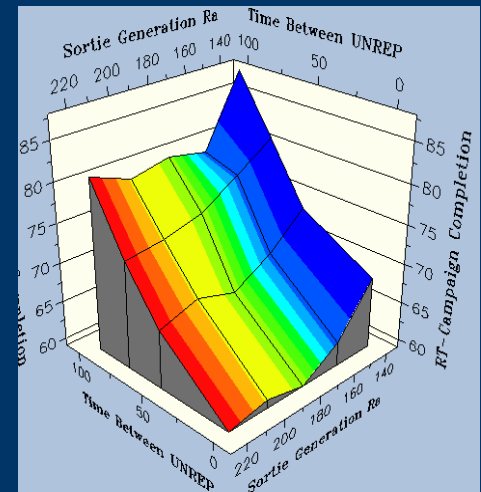
## WBB Process™

- **Gather Data:**
  - Study the applicable technology and project the expected mission environment not only on systems being replaced, but on force structure and mission environment
- **Synthesize:**
  - Apply broad operational experience of WBB Navy/Marine/Air Force/Army personnel to develop employment concepts
  - Focus on the differences new technology & new environment will create from the way we do today's missions
- **Validate:**
  - Validate new concepts with: Warfighters, Designers, Modelers/Analysts



# Operations Analysis

- Cost-effective solutions to meet requirements
- End-to-end analyses focusing on particular measures or warfare areas
  - Optimization and Stochastic tools
- “Bookends” – leading and overseeing analytical efforts:
  - Study plan development
  - Identification of measures
  - Scenario development
  - Interpretation and packaging of results
- Consulting to analytical staff
  - Red teams
  - Supervision of analytical teams
  - Analysis training
- 10 consultants with OA degrees; 23 OA practitioners



Models/Tools  
Processes/Data

Must Be In Balance

Concepts/Context/  
Capabilities

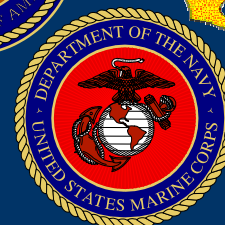


# Program/Finance/ Acquisition/JCIDS Support Examples

## Government

JSF/STOVL JSF  
 JDAM PIP  
 DD-21 including C4ISR  
 TAD-SE (CSFAB,CIDWG,SETs)  
 NSFS C4ISR/LAW Center  
 MV-22 ConOps/C4ISP  
 ONR-CCID  
 ASCIET / JADO/JEZ  
 TCS/DSEAD TacMemo  
 N64 Info Ops/Global WG  
 COBRA BALL/CS/RJ/SS Ops Guides  
 N865 Theater Air and Missile Defense  
 ASD/C3I Operational Architecture, ISR-ICSP  
 Sustaining Engineering  
 MRE/VTUAV/UCAV  
 Avionics Master Plan  
 F-15 C-E Roadmap

CVNX C4ISP  
 JCC(X)  
 NWPS/NSWPC  
 Shriever 2001 WG  
 QDR Support  
 Joint Assured Access  
 CSA/E-2C  
 SIAP SE  
 Stk Master Plan/NAMP  
 AIM9X/JHMCS  
 JFACC Afloat  
 B-1/B-2  
 NLW  
 F-15E  
 JBC  
 JICO



## Industry

Discoverer II  
 CAC2S  
 F/A-18G ConOps  
 JASSM and CASOM  
 AIM-9X  
 GEN III FLIRs  
 Tactical Operations Centers  
 FOPEN/FOREST  
 MIRFS  
 USCG Deepwater  
 SFW  
 FCS

Mako LCA/AT  
 Tomahawk III / IIIA / IV  
 JSOW  
 ATF COE  
 F-14 / LANTIRN  
 Naval Fires Network  
 CVN77  
 UCAV/MRE UAV  
 JHMCS  
 MALD  
 LOCAAS/MMC/SDB  
 GE 110 SLEP



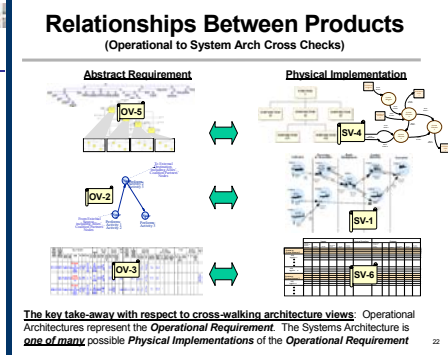
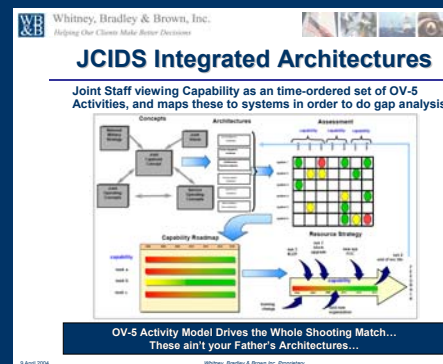
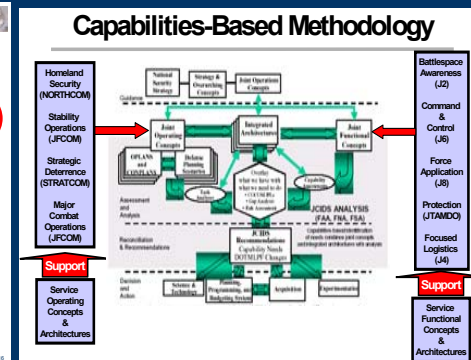
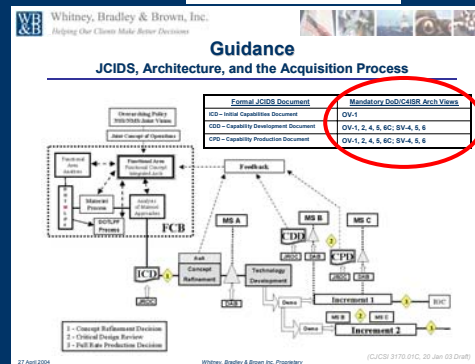
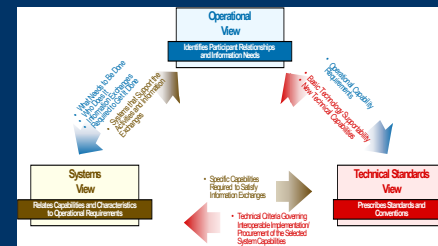
Raytheon Systems Company



# Integrated DoD/C4ISR Architectures

## JCIDS Requires Integrated Architectures for NR-KPP

- Mandatory Product Views for CDD, CPD, ISP: OV-1, 2, 5, 6c; SV-4, 5, 6; TV-1
- Integrated Arch Requires:
  - Understanding of JCIDS Process
  - Understanding of Joint and Service Operational and Functional Concepts
  - Understanding of DoD Arch Framework Product Interrelationships
  - Interconnectivity between Architecture products
    - Facilitated by Automated Tools
    - Tools generally “user hostile,” experienced tool drivers a must



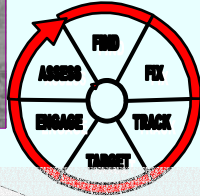
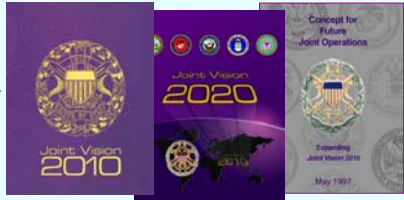
The key take-away with respect to cross-walking architecture views: Operational Architectures represent the Operational Requirement. The Systems Architecture is one of many possible Physical Implementations of the Operational Requirement.

Proven capability in developing Integrated DoD/C4ISR Architectures...

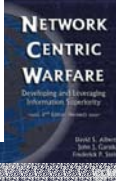
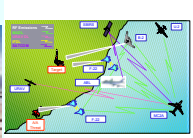
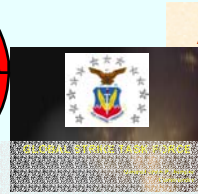


# Where Enterprise Architecture “Fits”

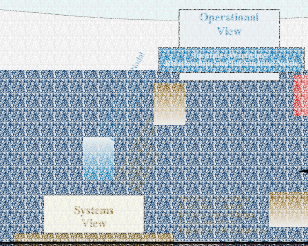
## Relationships Between Architecture and Systems Engineering



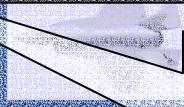
### “Blue Sky” Vision



# Enterprise Architecture



Weapon Systems



Architecture & Systems Engineering Overlap

Major Subsystem/Avionics Suite

# Systems Engineering

Functional Architecture/Integrated Core Processing

Hardware/Software Building Block

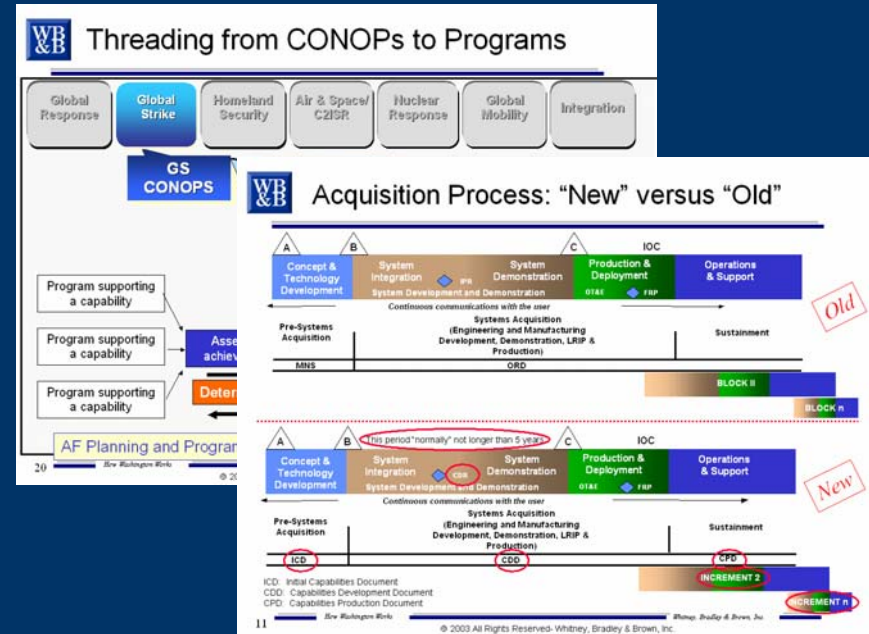
Hardware/Software Component



- **How Washington Works:**

- Requirements
- PPBS=>PPBE
- Acquisition System
- Congress
- Networking

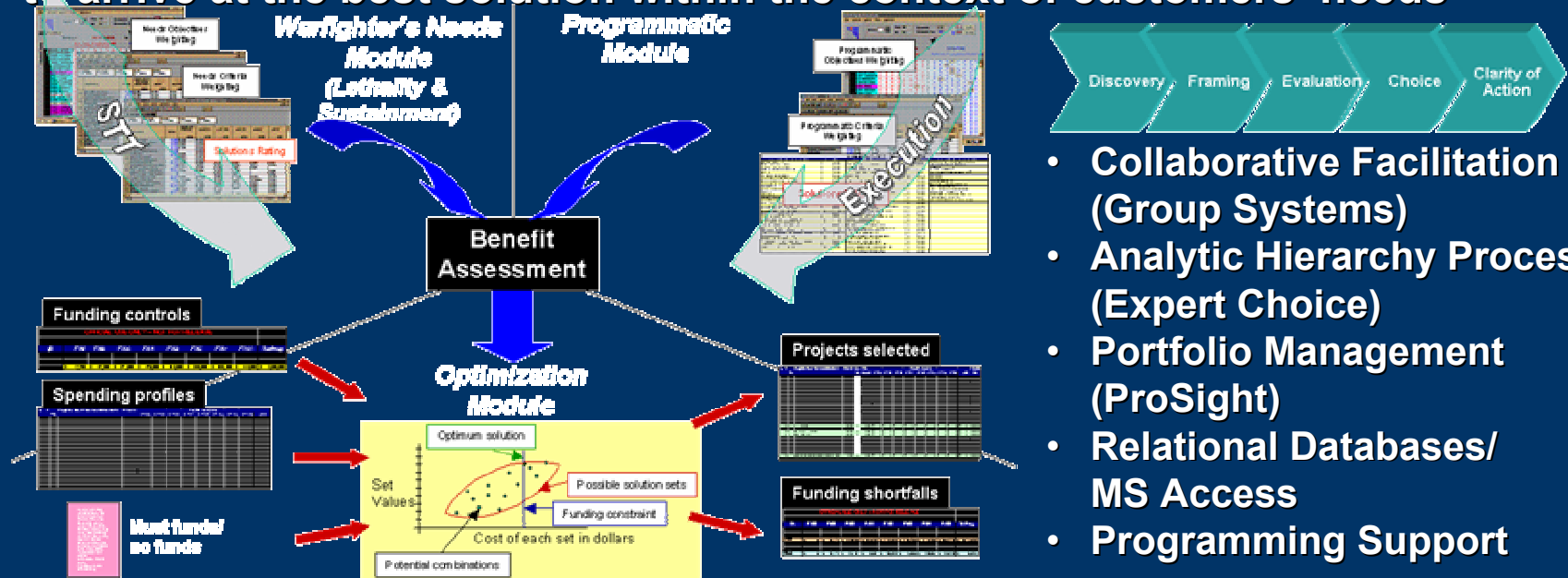
- Manpower, Personnel, & Training
- Operations Analysis
- GPS/Precision Targeting



Not just theory – how the system really works!

# Decision Support

- Provides knowledge, facilitation, and tools to support decision makers at any level of an organization
- Helps define, organize, analyze, and synthesize key decision variables to arrive at the best solution within the context of customers' needs



- Collaborative Facilitation (Group Systems)
- Analytic Hierarchy Process (Expert Choice)
- Portfolio Management (ProSight)
- Relational Databases/ MS Access
- Programming Support

Investment decisions that optimally align corporate resources with business objectives to maximize earned value





# Decision Support

## Scorecard Overview

Scorecard of Interest

Portfolio of Interest

Summary Values (portfolio view)

Projects (investments)

The screenshot shows a web-based scorecard interface. At the top, there's a navigation bar with 'SCORECARD', 'View', 'User', 'Setup', and 'Help'. Below this is a table with columns: Applications, Health Assessment\*, Life Cycle, Shut Down Date, Customer Satisfaction, Quality Assessment\*, Budget, Uptime (Actual)<--, and SLAs. The 'Applications' column is circled in blue. The 'Budget' column has a red diamond indicator circled in blue. The 'Uptime (Actual)<--' column has a red diamond indicator circled in blue. The 'SLAs' column has a red diamond indicator circled in blue. The table lists various projects such as 'IT Products and Services', '3-D Seismic Application', '3-D Seismic Workstations', 'Cable Drilling Rigs', 'Crop Drying', 'EBB', 'Emergency Preparedness Program', 'Enhanced Oil Recovery System', 'EPA Acquirer Storage Compliance', 'Exploratory Wells', 'FERC-EBB Compliance', 'Fractionators', 'Fuel Cells', 'Gas Turbo Expansion Turbine', 'Geological Mapping System', 'Guided Boring Systems', 'Helium Recovery Contract', 'Horizontal Well', 'Intelligent Robotics Inspection Dev', 'LDC Customer Rate System', 'Magnometer', 'Magsat Data Access System', 'MWD System', 'al Contract', and 'Education Training'.

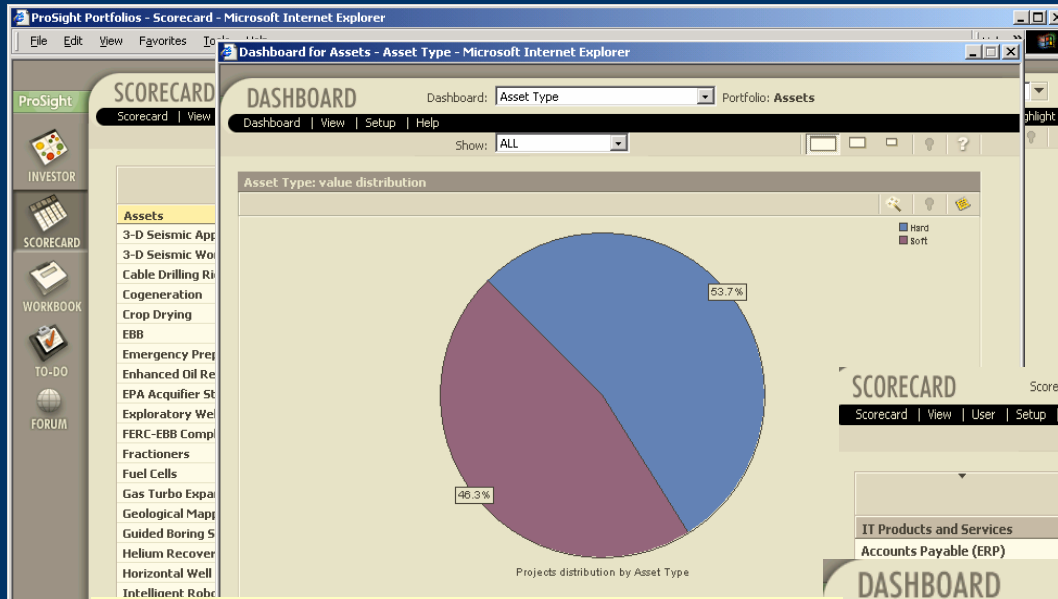
Category

Scorecard provides detailed view of key business and project parameters

Cell Value or Indicator (manual or extracted from other data sources)

# Decision Support

## Dashboard Overview



GRAPH TYPE ?

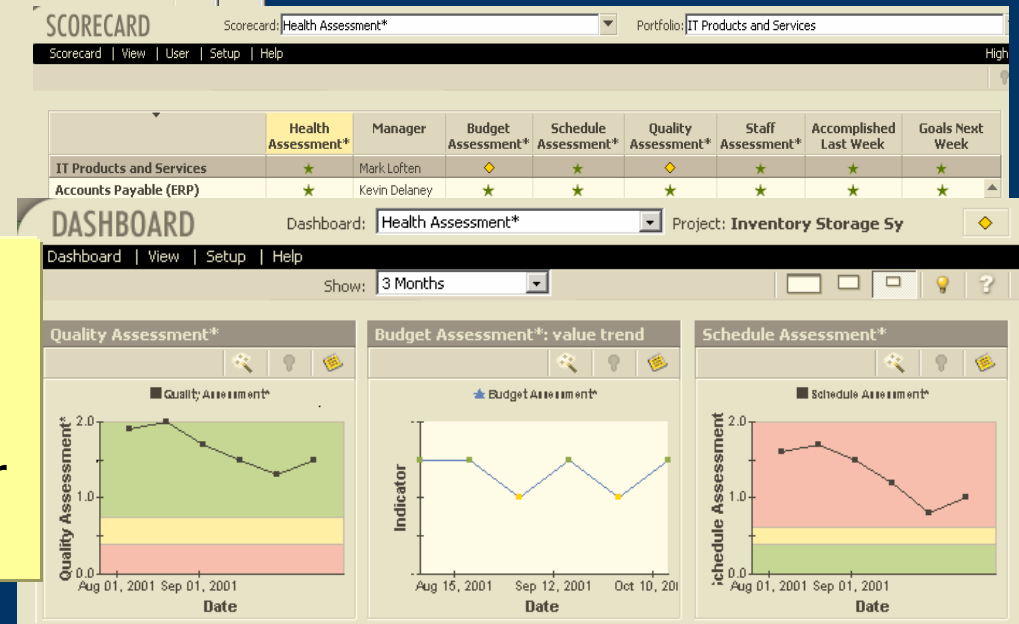
Choose the graph type you wish to create:

Distribution Graph

Trend Graph

Scatter Graph

OK Cancel



For selected attributes, Dashboard displays information in bar chart, pie chart, trend graph, or scatter graph forms



# Decision Support

## Investor Map Overview

Map of Interest

Portfolio of Interest

Totals & Goals

Filters

Projects  
(in the portfolio)

Y Axis

X Axis

Size By

Color By

Investor Map shows project dynamics and portfolio performance across multiple variables (4 dimensions)

