



DoD Transformation and The Global Information Grid

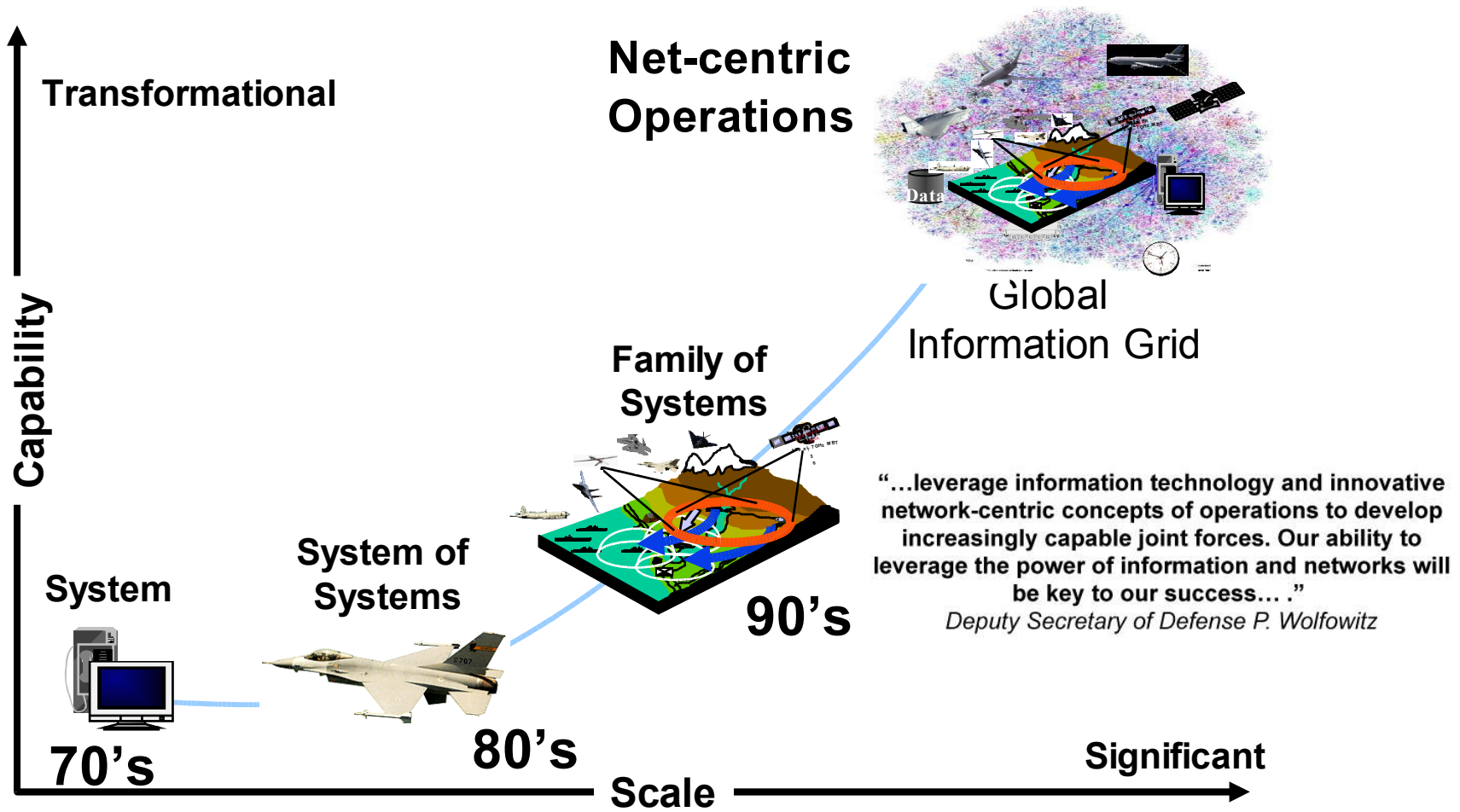
Implications for GIS of Emerging Net-Centric Warfare Operational Concepts

Mr. Rob Walker

9 July 2003

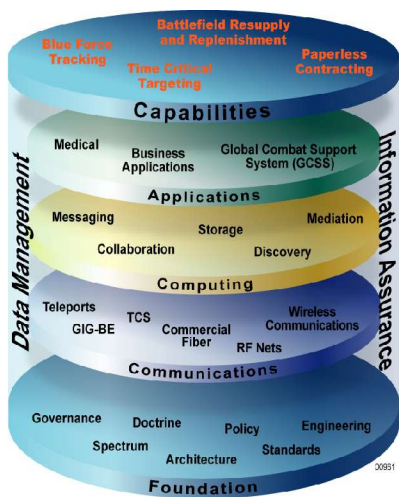


Net-centric Challenge & Payoff





The Key Components of Net-Centric GIG Infrastructure



Foundation

→ Provides an approach to manage, operate, and change the culture

Communications

→ Provides a comprehensive terrestrial and space network

Computing

→ Provides services to exploit the network and support applications

Applications

→ Provides tools needed for a capabilities based force

Data Management

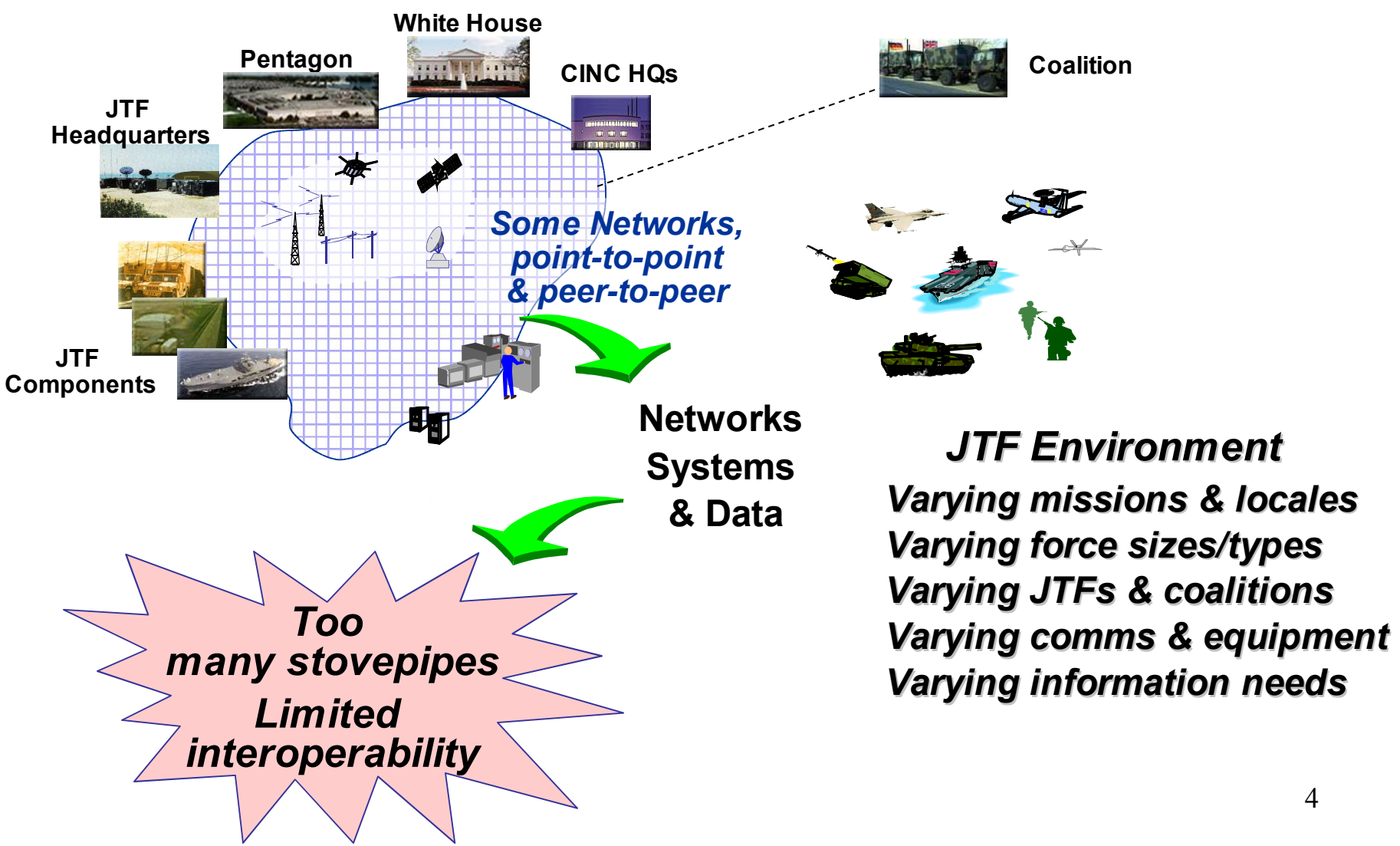
→ Ensures all data is discoverable and understandable

Information Assurance → Protects the data and the network

The Enterprise Infrastructure is Greater Than the Sum of the Components



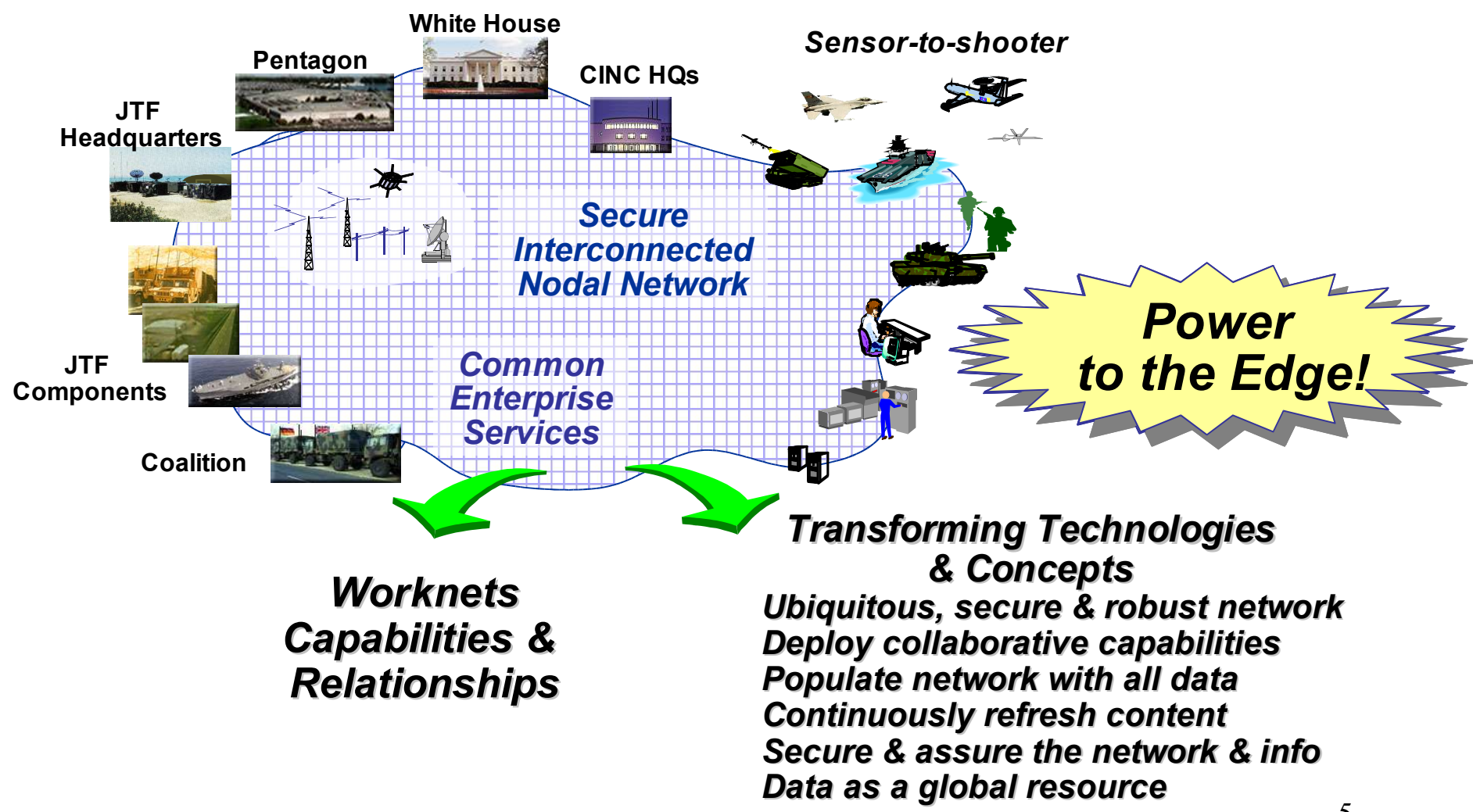
Today's Operational Environment





Tomorrow's Operational Environment

The DISA Transformation Vision





What's In? What's Out?

with Net-Centricity

IN

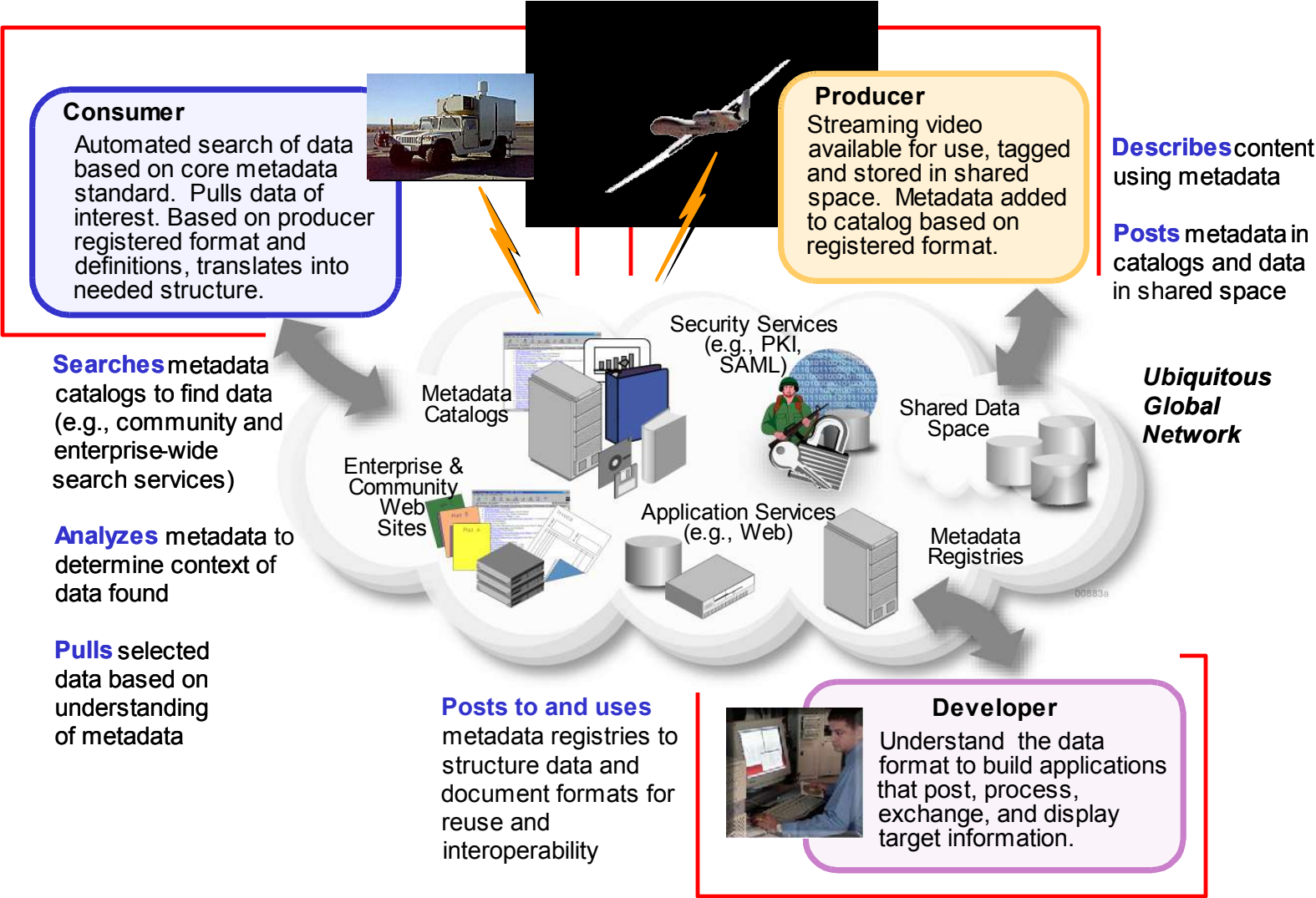
- Situational awareness
- Self-synchronizing ops
- Information pull
- Collaboration
- Communities of Interest
- Task, post, process, use
- Only handle information once
- Shared data
- Persistent, continuous IA
- Bandwidth on demand
- IP-based Satcom
- Diverse routing
- Enterprise services
- COTS based, net-centric capabilities

OUT

- Limited operational picture
- Autonomous ops
- Broadcast information push
- Individual
- Stovepipes
- Task, process, exploit, disseminate
- Multiple data calls, data duplication
- Private data
- Perimeter, one-time security
- Bandwidth limitations
- Circuit-based Satcom
- Single points of failure
- Separate infrastructures
- Customized, platform centric IT



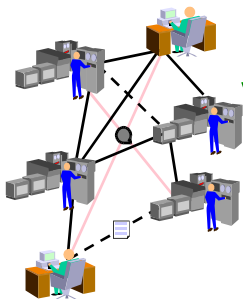
Making Data Accessible





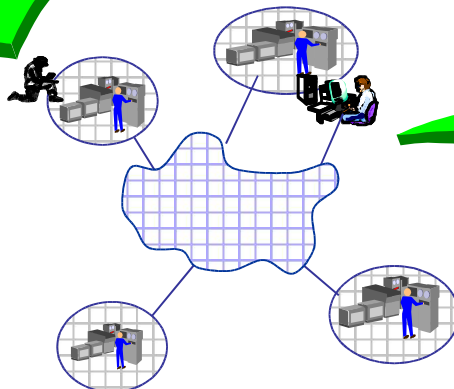
On the Road to Network Centric Warfare

Pre-Web...



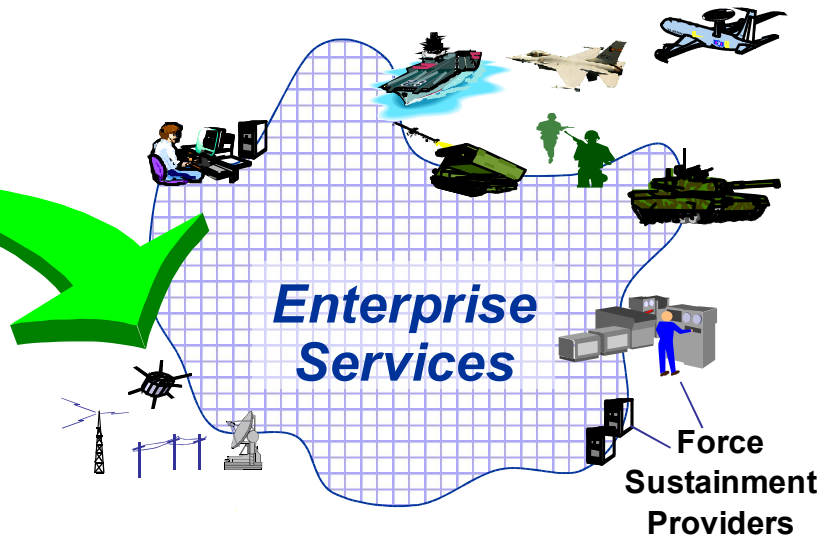
- *Stovepipe systems*
- *Little or no interoperability*
- *Some network connections*

...Today...



- *More networks*
- *Some web services*
- *Various directory & security services*
- *Uncoordinated Service/Functional transformations*

... Joint / Enterprise



- *Pervasive networks*
- *Mission-effective apps & applets*
- *Assured, interoperable enterprise services*
- *Dynamically composable architectures*
- *Robust & reliable edge computing*
- *Accurate, timely & relevant info*
- *Improved Quality of Service (QOS) with centrally managed infrastructure*



GIG Enterprise Services Scope

Domain & COI Enterprise Services

include levels of services *beyond* the
9 Core, Net-Centric Enterprise Services

Domains and their COI: - Business - Warfighter - Intel

Plus: Cross-Domain COI

Plus: Expedient COI

**GIG
Services**

Net-Centric Enterprise Services (NCEs Program)

FY04-09: \$380M

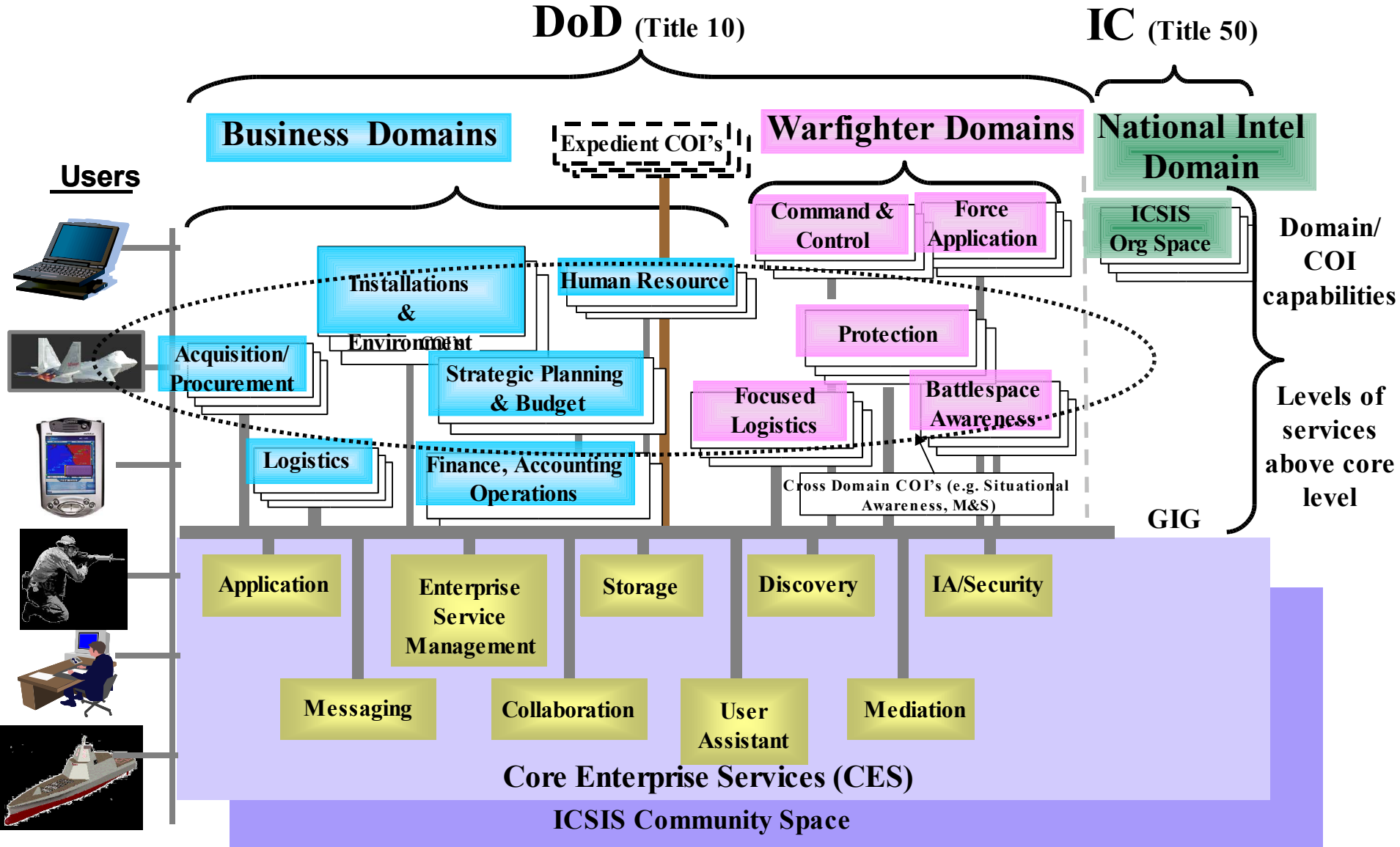
Milestone B, 2nd QTR FY04

Scope Includes:

- 9 Core Enterprise Services
- Application Program Interfaces (APIs) for CES

GIG Enterprise Services

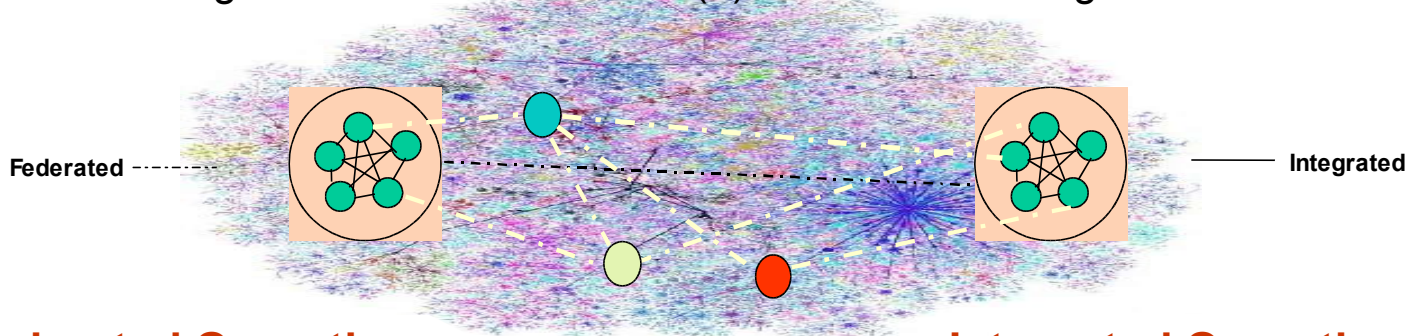
Support real-time & near-real-time warrior needs, and business users





Horizontal Fusion

Horizontal Fusion is net-centric with (1) a focus on data - cross functional posting, Ad Hoc access to and fusion of data that is created by operations processes which are integrated and federated and (2) a focus on making sense of that data.



Federated Operations

Enterprise Value mostly derives from loosely coupled functional processes, some operating in a “just in time” manner. Cross functional contributions or contributions from multiple Communities of Interest (COI) to enterprise value are substantial.

Integrated Operations

Enterprise Value derives from processes that must be executed against tight timelines with high assurance. Processes may be either functional or cross functional but generally execute within a well defined Community Of Interest (COI).

Fusion

The merging of different elements into a union



Collateral Space: Enterprise Service

- Horizontal Fusion Enterprise Services

- Security Services
- Discovery Services
- Application Services
- Mediation Services
- Storage services
- ESM services
- Messaging services
- Collaboration services
- User assistance

Selective Demonstration, *but*
not a focus of the pilot

Provide operators on the edge with the applications and data access to achieve a near real-time dynamic view of the battlespace



Security Services

- User Access Control
 - Identification and authentication
 - Authorization
 - Single sign-on
- Cross-Domain Data Exchange
 - E-mail messaging
 - Structured situation and location data
 - Documents
 - Video
 - Metadata



Discovery Services

- Intelligent Search
 - Military vocabulary
 - Google bar
- Cataloging
 - Coordinated SIPRNet cataloging
 - Cross-domain cataloging (SIPRNet-JWICS)
- Integrated Metadata Management
- Discovery
 - People/expertise
 - Applications/services
 - Content



Making Data Accessible

- Create shared information spaces and data exposure services
 - Provide Web-Services style access
 - Deploy information resource subscription capabilities
- Associate security-related metadata
 - Deal with “single sign on” issues
- Adopt metrics and incentives



Mediation Services

- **GES Discovery Metadata Vocabulary**
 - Core Standard (Dublin Core)
 - Security (CAPCO)
 - High level DoD-IC taxonomy
 - COI extensions
- **CES Federation**
 - Intra-CES Metadata transformations
- **COI-to-CES Transactions**
 - Multi-ontology support
 - Semantic translations



Application Services

- Portal Infrastructures
 - Operational hosting
 - Development environment
- Integrated Visualization
 - Portlet management, integrated geospatial display
- Application Integration
 - Intel and C2 applications
 - ACTD capabilities
- Publication Services
 - Net-wide TPPU
 - Advertise available products and services
 - Post needs, task assets



COE Commercialization

- Source code for Posix/Linux COE turned over to industry
- Industry consortiums free to vary from Government-provided baseline as long as resulting software passes verification testing
 - GOTS code will be phased out as Industry Best Practices emerge
- Government-funded enhancements in COE Kernel Platforms will be through industry processes (e.g., open source initiatives)
- Government may influence industry direction through participation in industry groups & standards bodies



Platform Desired End-state

- COE Certification Criteria defines the COE-Era platform, including information assurance configuration.
- Future Certification industry-based
 - Posix/TCP-IP/X Platform certification available via The Open Group
 - Linux certification available via Free Standards Group
- Any gaps in standards-based functionality is defined by GOTS Reference Implementation
 - Cross-Platform User Accounts and Profiles
 - Package Format and Installation Tools
 - Common Data Store



Industry Process for COE Linux Kernel

- Free Standards Group has populated a Linux SourceForge repository accessible via web
- Content includes Linux kernel GOTS, that is:
 1. RPM (RPM Package Manager)
 2. GNOME 2.0
 3. Java Based Developers Toolkit (JBDT) & Runtime Libraries (COE APIs)
 4. Account and Profile Management (APM)
 5. Common Data Store (CDS)
- Develop processes for managing incorporation of source code updates



COE Windows Commercialization Strategy

- No major Government-funded enhancements in COE Kernel Platforms
- Monitor Microsoft's market direction and use native tools
- Maintain Application Platform Criteria.
- FSO Gold Disk strategy supported



Platform Definition: GES Approach

- Focus is J2EE-oriented software platform
 - Less emphasis on hardware platform for application interoperability/portability
- Develop Application Platform Criteria maintained and made available for use in certification programs
- Adopt FSO Gold Disk and guidance when available.



Platform Information Assurance: GES Approach

- NIAP Medium Robustness Protection Profile (MRPP) replace appendix E of the Compliance Criteria
 - MRPP is broader and moves away from government specific requirements to industry standards
- Security lockdown will be coordinated with the FSO gold disk strategy
- GOTS code will be phased out as Industry Best Practices emerge



GES Platform Supplemental

- To the minimum extent necessary, DISA will provide platform specific guidance as compliance criteria for:
 - Level 5 compliance for transitioning legacy applications
 - Posix/TCP-IP/X based platforms
 - Linux platforms
 - Windows platforms
- Leverage Industry testing/certification, and
- Apply FSO guidance and NIAP process,
... to the maximum extent appropriate.



Target Architecture

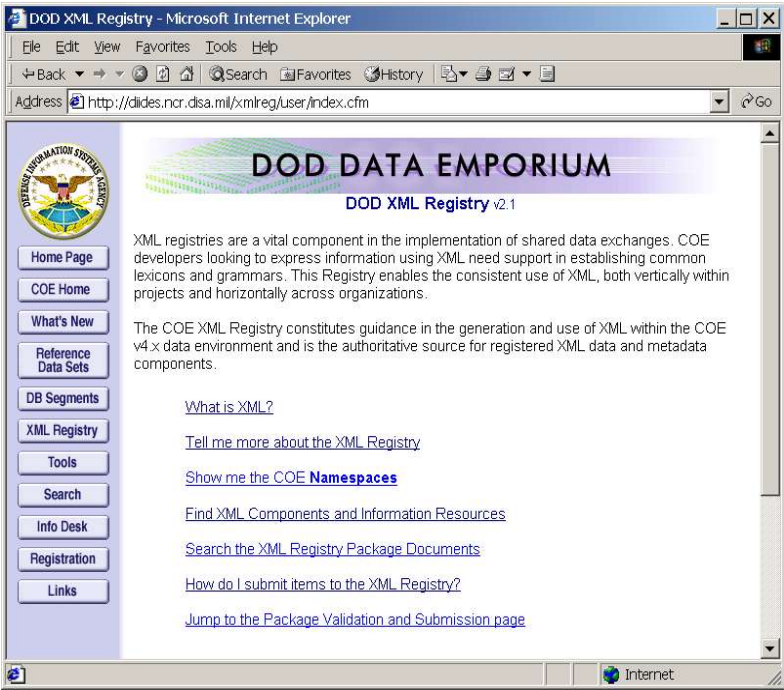
- Enterprise Architecture
- Services available via the net (not system dependent)
- Web-services based application platform (Backend)
- COTS products (Partnering with Industry)
- Open development environment (JCP and Open Source or Shared Source where it makes sense)



Build-Time Electronic Market

DOD Data Emporium

<http://diides.ncr.disa.mil/shade>



Purpose: visibility and re-use, not standardization through mandate!

- “One Stop” Publish & Subscribe
 - Data/metadata Registration
 - Data Component Vending
 - COI Creation & Management
- Current Version vending
 - XML
 - Reference Sets
 - Transformations
 - Data Tools
 - DB Segments
- Upcoming Versions
 - Robust Subscription Service
 - Better Metrics and Search
 - More Products (e.g., ontologies)
 - Run-time interfaces



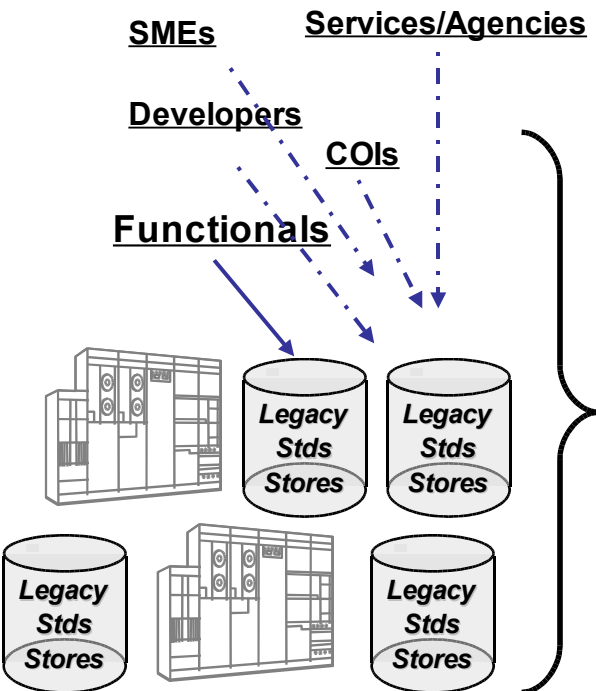
GES IT Standards Approach

- Minimize Enterprise Level Standards
 - Key on standards required to enable Net-Centric Vision
 - Focus on integration points as required
 - Include:
 - Enterprise implementation guidance
 - Basic architectural precepts (e.g., GIGv2)
- Communities of Interest (COI's) provide detail
 - Publish and manage COI Standards Profiles
 - Include COI-specific implementation and architecture guidance
 - Most MilStds are in COI Portfolio's
- Enterprise-wide Visibility Service
 - All publish via NCES using XML Registry paradigm²⁷

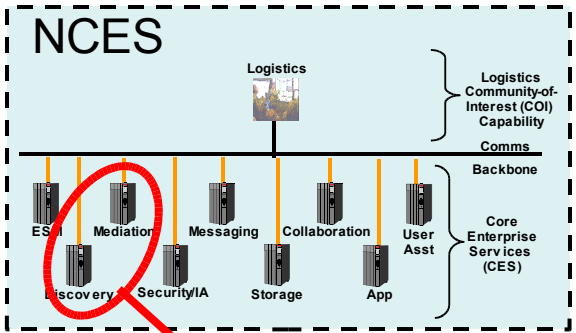


IT Standards Management Transformation

Legacy Standards Management Processes

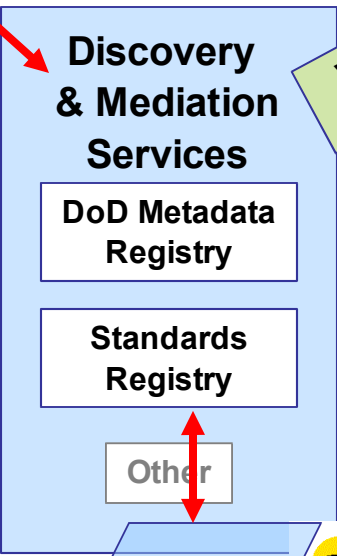


Migrate Standards to NCES



Federated Standards Process

Standards Registration



Subscription Process

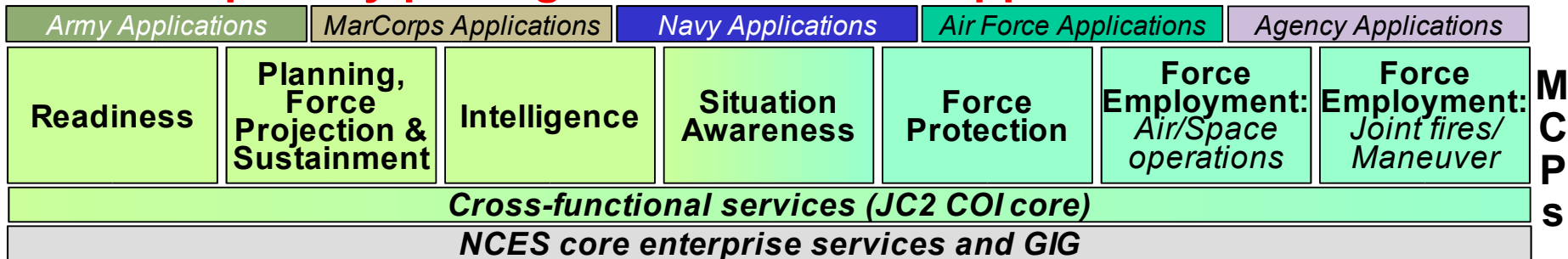


Net-Centric: "Post before Processing"



JC2 Transformation Vision

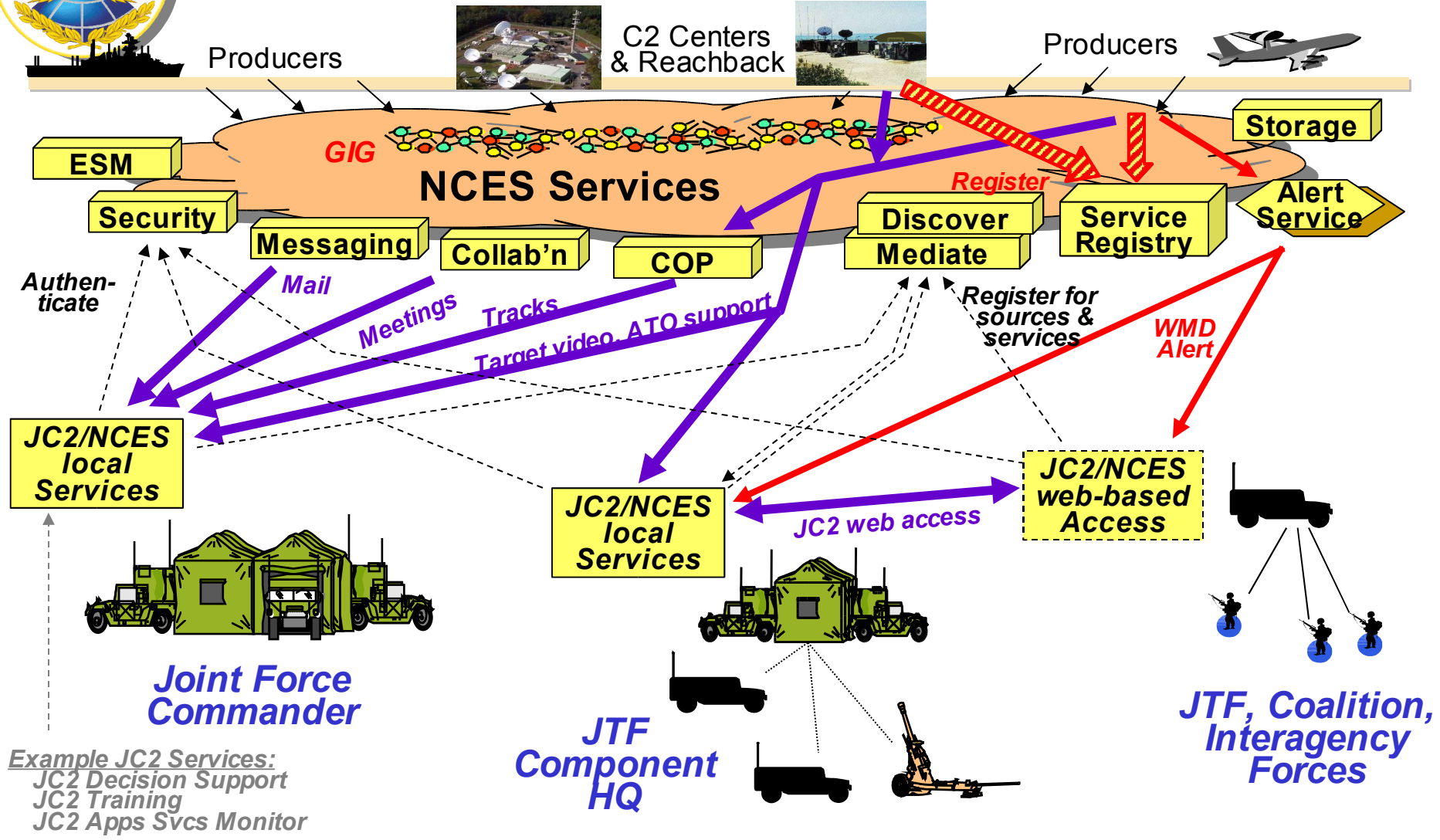
- “Today’s Global Command & Control System (GCCS) will evolve from its current state of joint and Service variants to a single Joint C2 architecture and capabilities-based implementation”
 - Service-oriented architecture comprised of **mission capability packages** and **Services’ Applications**



- Based on **GIG / NCES infrastructure** providing shared access to Service/Agency/joint data sources



JC2 Interaction with NCES



NCES will provide a common set of interoperable information capabilities in the GIG to access, collect, process, store, disseminate, and manage information on demand for warfighters, policy makers, and support organizations.



What is involved in C2 transformation?

- Modernization of C2 infrastructure to support transition to JC2
 - WebCOP (Web 1.0)
 - Web Services transition (Web 2.0)
- Incorporation of data strategy
 - XML Registry expansion (Run-time)
- Open development environment
- Process improvements
- Modeling of capabilities (Static/Dynamic)
- Concept pilots and demos



What needs to change for C2 to Transform?

- Client-Server transition to Services Context
- Better QoS capabilities in platform and network infrastructure
 - Dynamic allocation of computing resources
 - Graceful Degradation
 - Grid Computing concepts
- Fusion architecture to provide:
 - Information manager for data producers
 - Association/Correlation/Fusion functions
 - Access by edge users
- Web Services infrastructure
- Composable Implementation (Component/Object Based)



JC2 in a Service Oriented Architecture

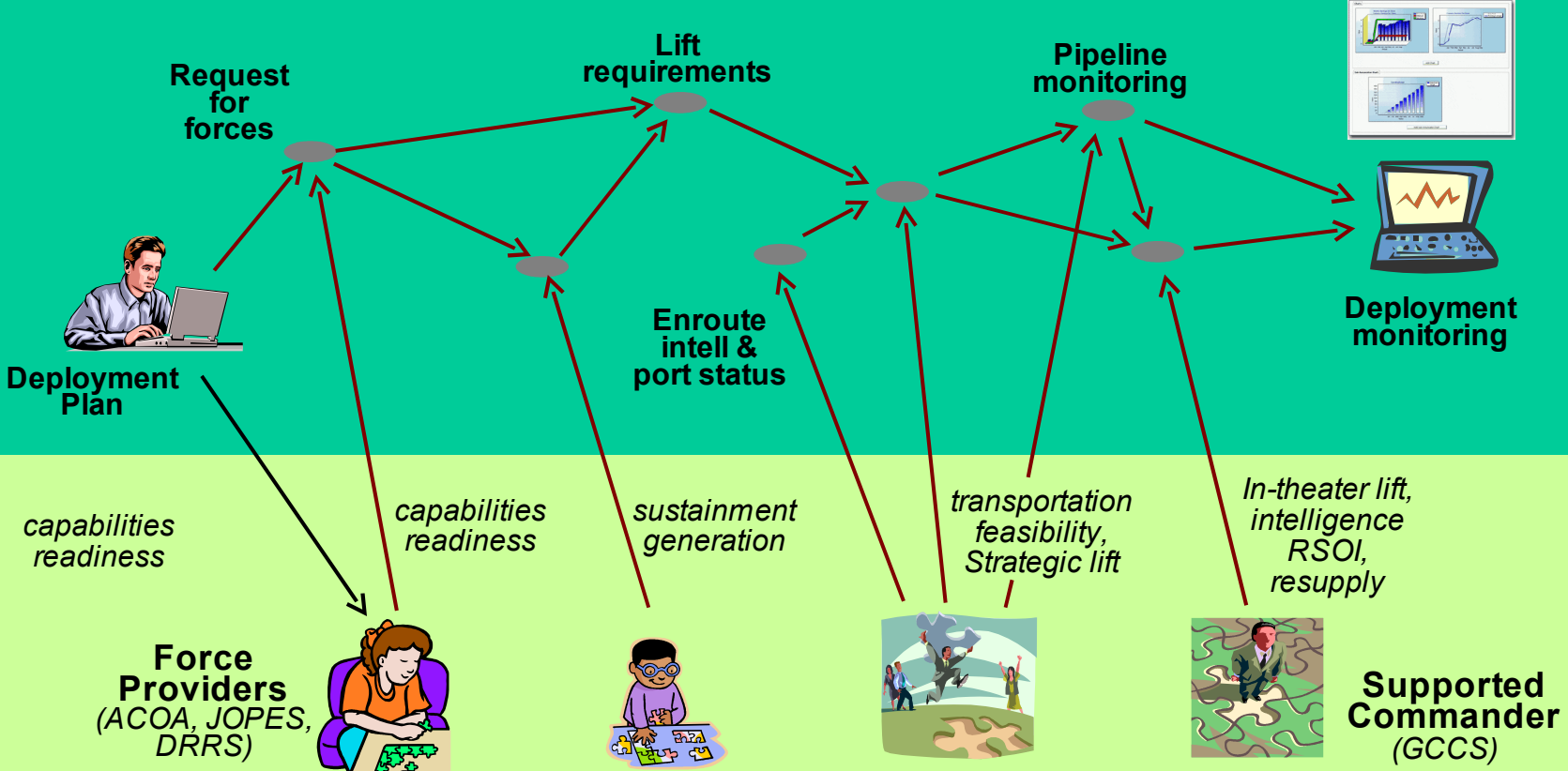
An example: Joint Deployment

The process – Business logic

Metrics: What is my business performance?

WHAT

HOW

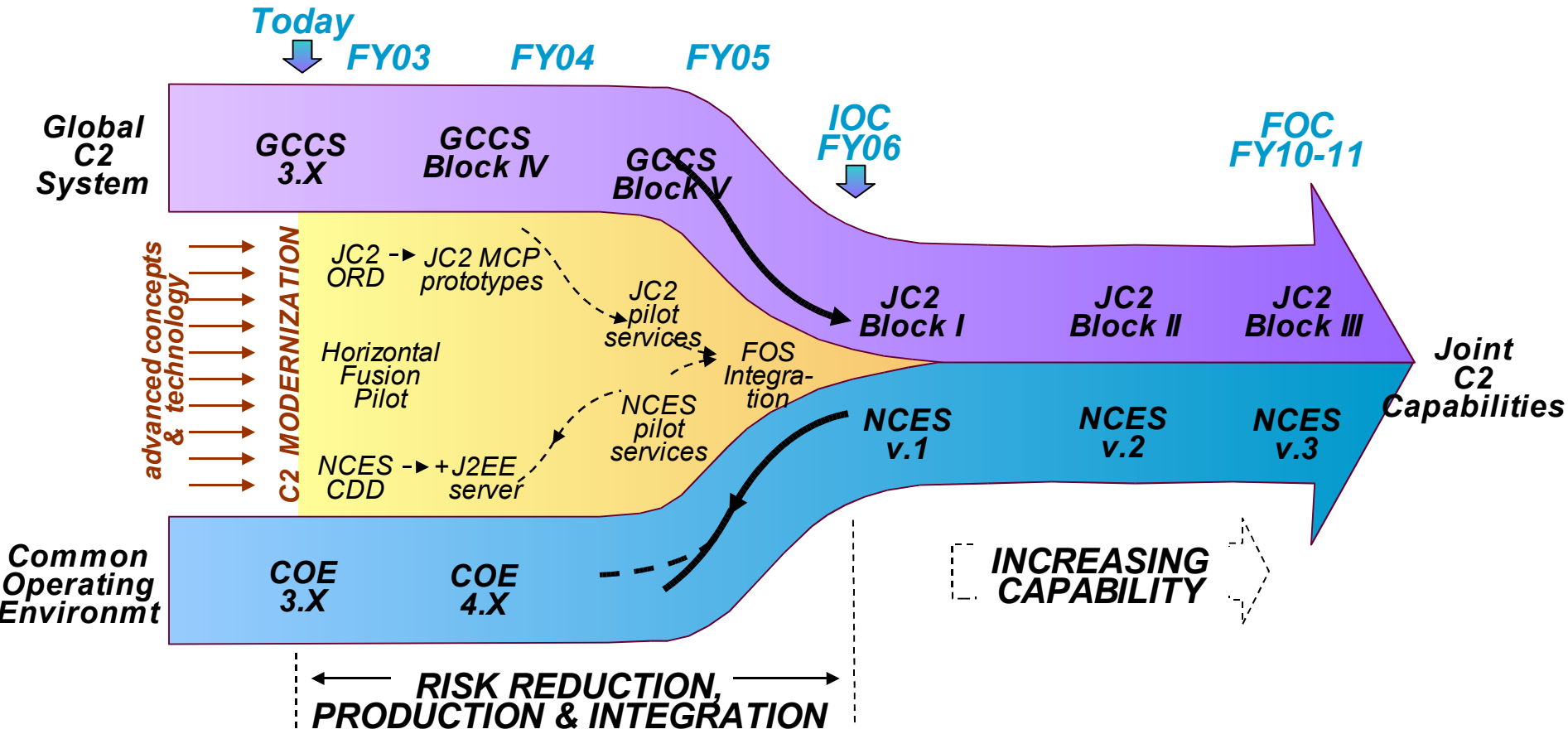


The implementation – organization & IT components

Legacy: No single data / process models usually across (or beyond) the enterprise



C2 Modernization Plan for Transition to JC2



- Prototype the functionality of Mission Capability Packages
- Work out interfaces between MCPs
- Work out interfaces with NCES core services
- Develop C2&I-specific net-centric services
- Pilot MCPs with GCCS Block V in operational context
- Integrate final versions with production NCES v.1



Summary

- Change is in progress
- Cultural shift from Client-Server to Net-Centric capabilities
- Grid Computing is part of our future
- Application integration needs to evolve
- Need better way to get capabilities into the hand of the warfighter... faster!
- Coordination with our Service and Agency partners should set into action a plan for C2 transformation