



# System of System Common Operating Environment (SOSCOE): "Changing the Game" of Service Oriented Architecture for the Army



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# Report Documentation Page

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# Agenda

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- Problem Statement
- Army's Approach
- What is SOSCOE?
- Key capabilities of SOSCOE
- The SOSCOE Approach
- SOSCOE Benefits
- Summary

# Problem Statement

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- The current environment for the acquisition and development of Army tactical applications involves many challenges:
  - Reduced schedules and budgets.
  - Evolving hardware, OS, and networks.
  - Integration of increasing amounts of software.
  - Unique operational requirements.
  - Addressing system “stovepipes”.

# Army's Approach to Layered, Networked Architecture



**Integrated Architecture Provides Design-Phase Flexibility and Tactical Adaptability For The Networked BCT-Modernization**



# What is SOSCOE?

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- SOSCOE is a services layer (including middleware) that provides isolation between application services and Operating System (and Computer hardware)
  - Makes Applications easier to develop and maintain, reducing life cycle costs
- SOSCOE provides a single development and deployment environment for the Tactical Domain, similar to how Microsoft provides a total environment for the Enterprise/Operational Domain
- SOSCOE supports and aids all phases of Tactical software Applications:
  - Development
  - Operational Use
  - Maintenance

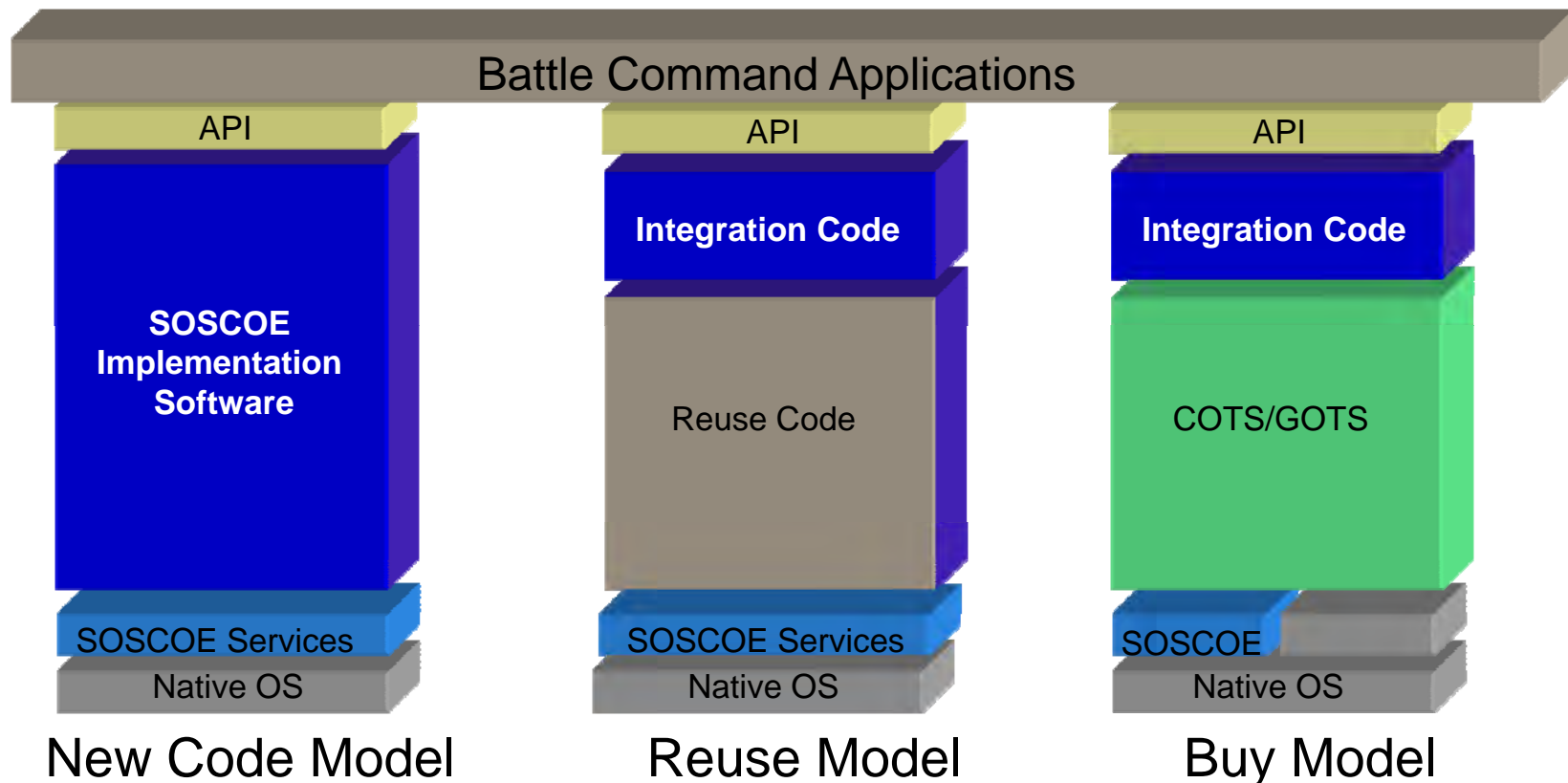
# SOSCOE Offers Key Capabilities

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- Information Assurance
- Discovery
- Quality of Service
- Orchestration
- Interoperability with Current Force
- Interoperable with GIG
- Collaboration
- Extensive COTS/OSS use
- Commercial Help Desk and documentation
- Isolation of systems from hardware and operating system
- Safety and Mission Critical support

# The SOSCOE Approach



***By basing the SOSCOE APIs on standards (DISR, WSTAWG, OMG, etc.), the Battle Command Services are isolated from any dependence on the computer HW, OS and COTS products.***

***This allows applications to take advantage of newer HW, OS and COTS with Minimal impact and cost***



# SOSCOE Benefits



- SOSCOE "tactical" mission execution enablers:
  - Configured/managed secure communications over bandwidth constrained, ad-hoc communications networks
  - Vertical and horizontal flow of C2 messaging and SA as appropriate
  - Interoperability with systems external to the BCT (e.g., FBCB2, NCES)
  - Collaboration via instant messaging, email, or whiteboard
  - Individual "role based access" changes and unit reconfiguration "on the fly"
  - Discoverable services allow remote processing, scalability and fault tolerance
  - A uniform network configuration capability for the BCT
- SOSCOE provides software developers:
  - Common components and tools for rapid Battle Command software development
  - Documentation and Industry Standard interfaces to support software development
  - Abstracts Battle Command software from technical evolution of the Hardware via standardized APIs
  - Extensive training, documentation, customer support and help desk

# Summary

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- SOSCOE is a tailorable software toolkit to support legacy and SOA applications for the Tactical Domain
  - Designed to exist in a Bandwidth and Computer constrained environment
  - Supports net centric tenets
  - Product Line approach allows for a Scale-able application and maintenance
- Provides critical Information Assurance
- Reduces Enterprise life cycle costs
- Enables a loosely coupled system with “Plug and Play” of new hardware and software applications
- Allows the user to establish an “Investment Strategy” for evolutionary and incremental change



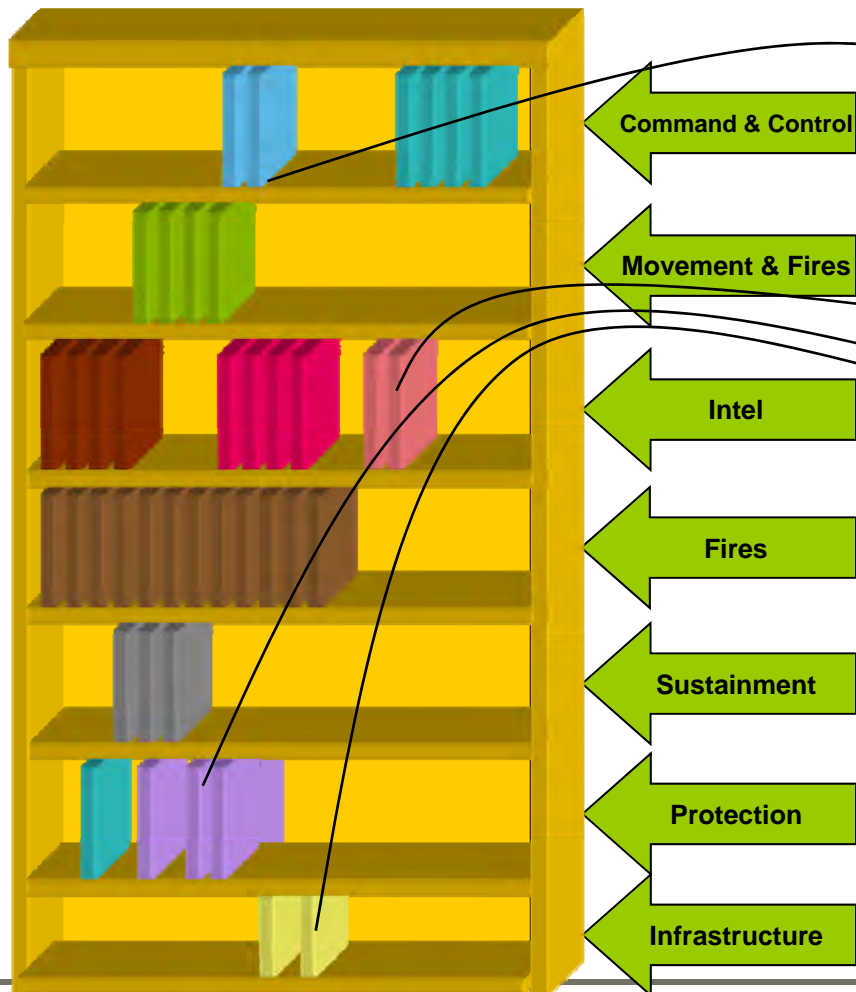
# Backup



# SOSCOE Provides “Composable, Discoverable, and Orchestratable Services” to Tactical Applications



## Library of BC Software Services (Battle Command Product Line)



“New Capability” required  
for Changing Threat

New BC  
Operational  
Requirements



- New Investment:**
- New Required Software Services
  - Goes into the Library for future use
  - New capability for BC product line

**Reuse Previous Investment:**

- Existing Software Services
- Existing “look and feel”
- Common architecture
- Common middleware
- Inherent interoperability
- Known Integration Risk
- Existing support framework
- Existing lessons learned
- the list is near endless

New BC Version  
for “New Capability”

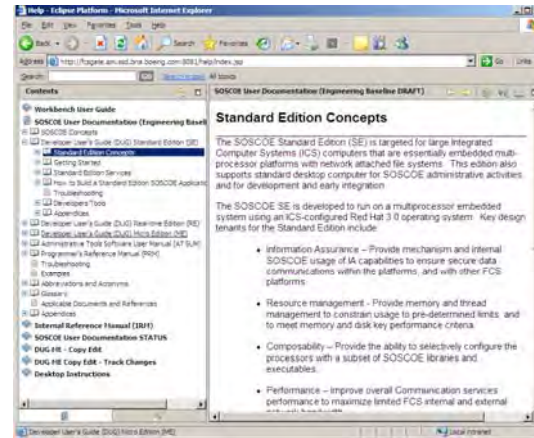


# SOSCOE Infrastructure Components and Tools Address the Needs of SOA in the Tactical Domain



## SOSCOE Software developer toolkit (SDK) includes

- Runtime software
  - Executable processes
  - Run time libraries
- Developer tools
  - Code generators
  - TDD editor
  - Administrative tools
- Documentation
  - Programmer's reference manual
  - Developer's user guide
- Installation and field upgrade tools
- Configuration examples



## Developer Tools



## Deployed Executables

***Use of a single toolkit significantly reduces maintenance costs, promotes reuse of applications and guarantees interoperable solutions***

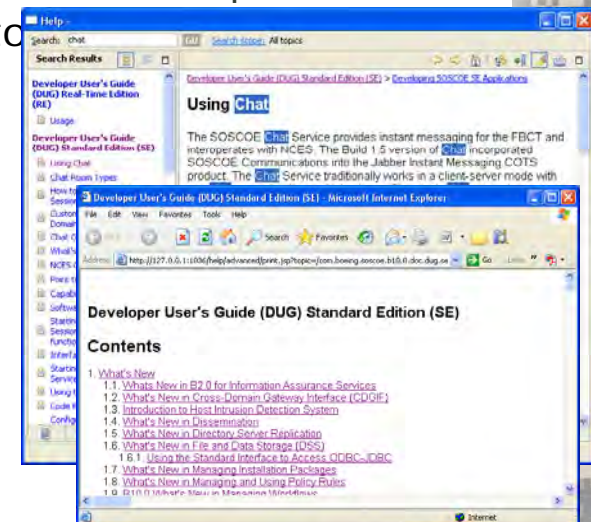
# Commercial-grade Documentation and Support Make Development and Maintenance of Applications Easier



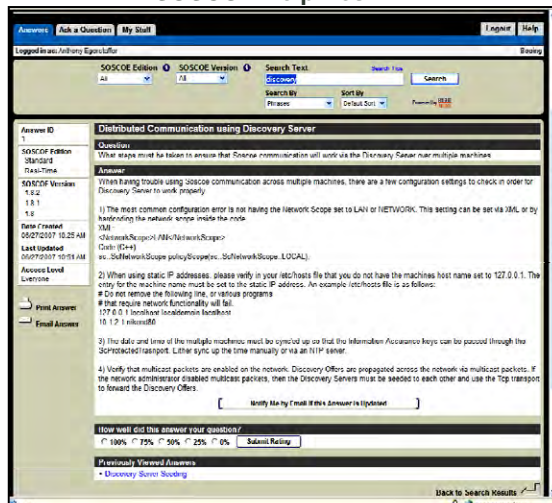
A cohesively designed set of software and information components developed to guide developers' interactions with SOSCOE products

- Interfaces include appropriate information and features to support developer tasks
- Reference and training materials address needs for just-in-time information as well as reflective learning
- Pointers to dynamic sources of information support use of SOSCOE products throughout their lifecycles
- COTS industry standard development environment and tools

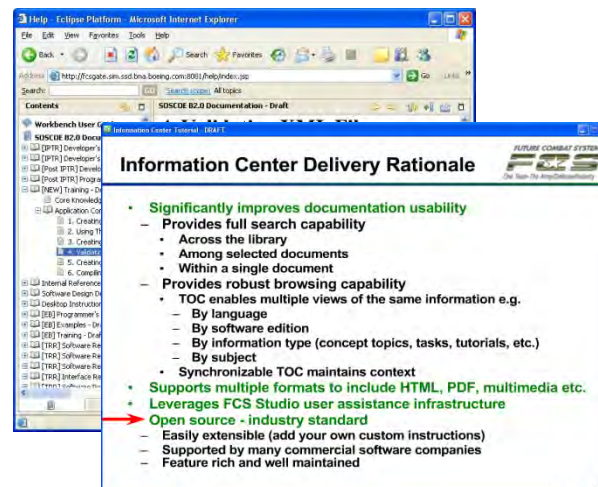
Developers User's Guide



SOSCOE Help Desk



SOSCOE information Center



**The right interaction for the right user at the right time**

# SOSCOE is a collection of product lines associated with scalable Editions



## SOSCOE Product Line

**Tactical COE Foundation:** Discovery and dissemination of services/data in a secure and trustable manner for the tactical environment

**Systems Management:** Uniform configuration and process management and customization for the tactical environment. Includes support for the maintenance of complex multi blade deployments, field update/versioning

**Interoperability:** Extensible and secure interoperability of data and services with external systems to include current force, enterprise services (NCES), and JIMI

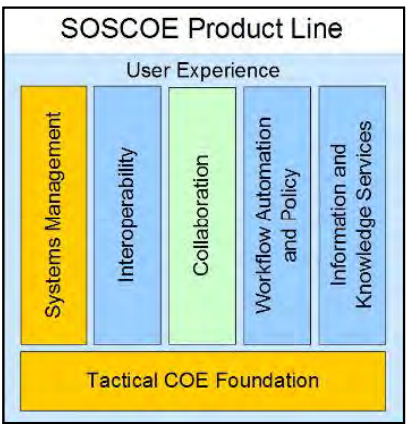
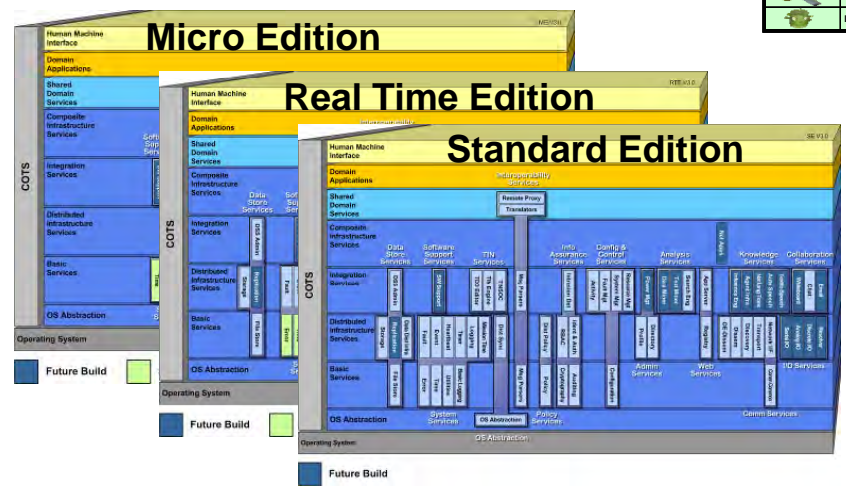
**Collaboration:** Instant messaging, whiteboard, and email capabilities supporting tactical users including seamless collaboration to enterprise users

**Workflow Automation and Policy:** Complete environment for automating and orchestrating operational task sequences for SOA-based applications

**Information and Knowledge Services:** Data management, mining, and search for the tactical environment including semantic interchange

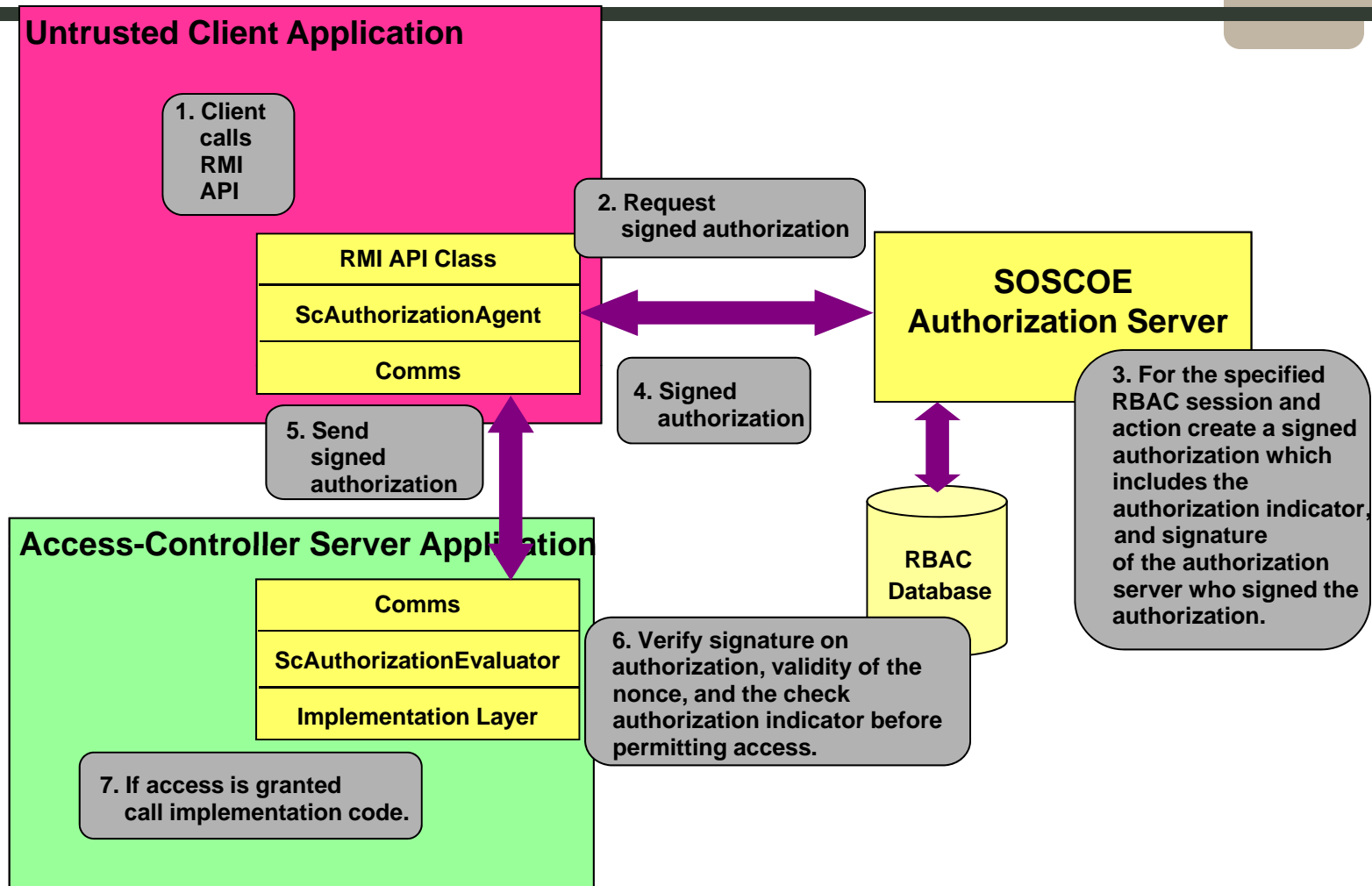
**User Experience:** Comprehensive source of user documentation, guidance, examples, and tutorials for solution developers and integrators

SOSCOE Deployments	Standard Edition	Real-time Edition	Micro Edition	1.8	2.0	2.5	3.0	3.5
Class I Unmanned Air Vehicles (UAV)		✓				✓	✓	✓
Class IV Unmanned Air Vehicle (Fire Scout)	✓	✓				✓	✓	✓
Non Line of Sight – Launch System (NLOS-LS)				✓	✓	✓	✓	✓
Small Unmanned Ground Vehicle (SUGV)		✓				✓	✓	✓
Multifunctional Utility Logistics Equipment Vehicle (MULE)	✓	✓						
Unattended Ground Sensors (UGS)			✓	✓	✓	✓	✓	✓
Soldier Systems	✓							
Command and Control Vehicle (C2V)	✓	✓			✓	✓	✓	✓
Reconnaissance and Surveillance Vehicle (RSV)	✓	✓			✓	✓	✓	✓
Infantry Combat Vehicle (ICV)	✓	✓			✓	✓	✓	✓
Mounted Combat System (MCS)	✓	✓			✓	✓	✓	✓
Non-Line-Of-Sight Cannon (NLOS-C)	✓	✓			✓	✓	✓	✓
Non-Line-Of-Sight Mortar (NLOS-M)	✓	✓			✓	✓	✓	✓
Medical and Evacuation Vehicle (MedEvac)	✓	✓			✓	✓	✓	✓
Maintenance and Recovery Vehicle (MRV)	✓	✓			✓	✓	✓	✓
Centralized Controller	✓				✓	✓	✓	✓
B-Kit	✓				✓	✓	✓	✓
Objective and Additional Systems								
Armed Robotic Vehicle (ARV)	✓	✓						
Class II Unmanned Air Vehicles (UAV)		✓						
Class III Unmanned Air Vehicles (UAV)		✓						
Intelligent Munitions System (IMS)			✓					



Multiple products and editions allow SOSCOE to meet performance, scalability, portability, composability, and interoperability requirements of platforms

# Information Assurance has been integrated into the base fabric of user and application interactions



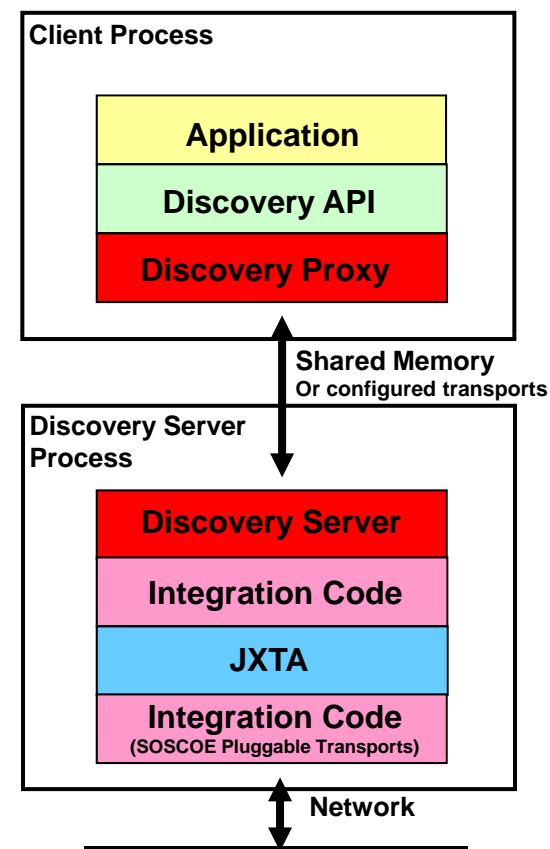
***Information Assurance is built in to the System from the Start***



# Discovery allows the network to only move required information between producers and consumer lowering bandwidth needs

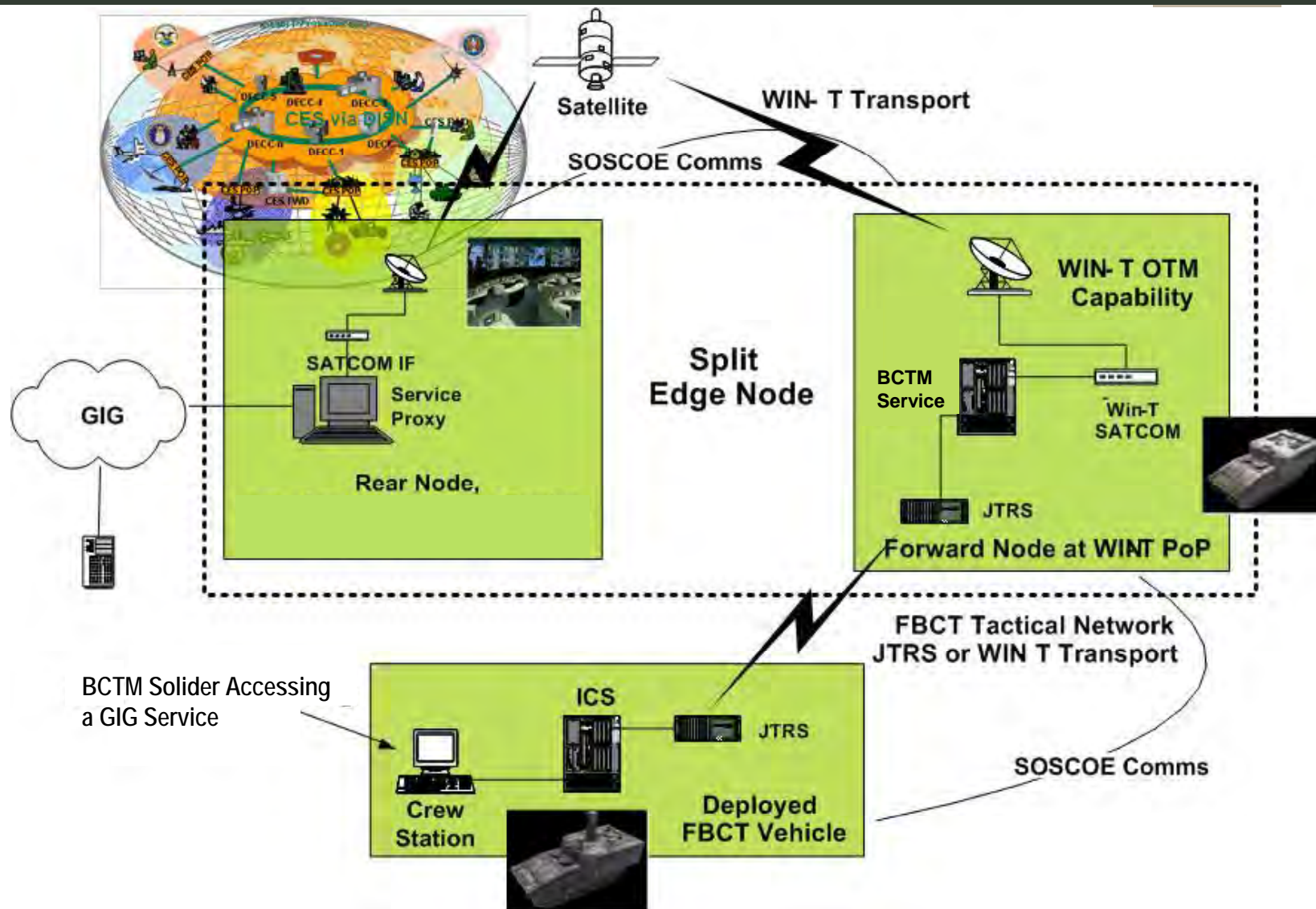


- Discovery
  - Provides applications the ability to register and lookup offers independent of network location
  - Sub-Components
    - **Discovery Proxy**
      - Application client hook to the Discovery Server
    - **Discovery Server**
      - Front end for Discovery Server application. Receives, performs, and responds to Discovery requests
  - **JXTA**
    - Backend Technology for Discovery Services.
    - Handles automatic Discovery infrastructure network formation, replication of offers, and dissemination of queries.
    - Integrated SOSCOE Pluggable Transports



***SOSCOE Discovery enables the construction of powerful, fault-tolerant service-based architecture in a tactical environment***

# SOSCOE provides interoperability between NCES/GES Web Services and the Tactical Edge



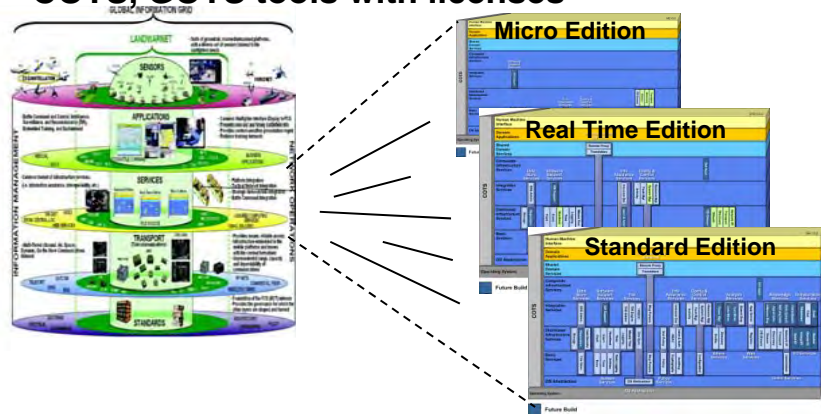


# The SOSCOE Development Environment

## Application SW Development - SOSCOE

### Components and Tools for Tactical Systems

- **SOSCOE STUDIO** available via WindRiver
- **Common Infrastructure Components**
  - Software Libraries
  - Software shared Objects
  - Executables (Collaboration, Interoperability)
- **Management / Monitoring tools**
- **Standards based-interfaces**
  - JDBC, ODBC, OMG, SOAP, HTTP, C++/Java
- **Security Infrastructure**
- **COTS, GOTS tools with licenses**



## Application SW Development - Microsoft

### Microsoft .Net Framework

- **Visual Studio**
- **Common Infrastructure Components**
  - Windows Communications Framework (WCF)
  - ADO.Net, SQL Server
  - Internet Information Services (IIS)
- **Management / Monitoring tools**
- **Standards based-interfaces**
  - WSDL, SOAP, HTTP, ADO, C#, Visual Basic
- **Code Access Security (CAS), WS-Security**
- **Microsoft Licenses**

**SOSCOE + Domain Developers + Quality Architecture = Tactical Network Software**

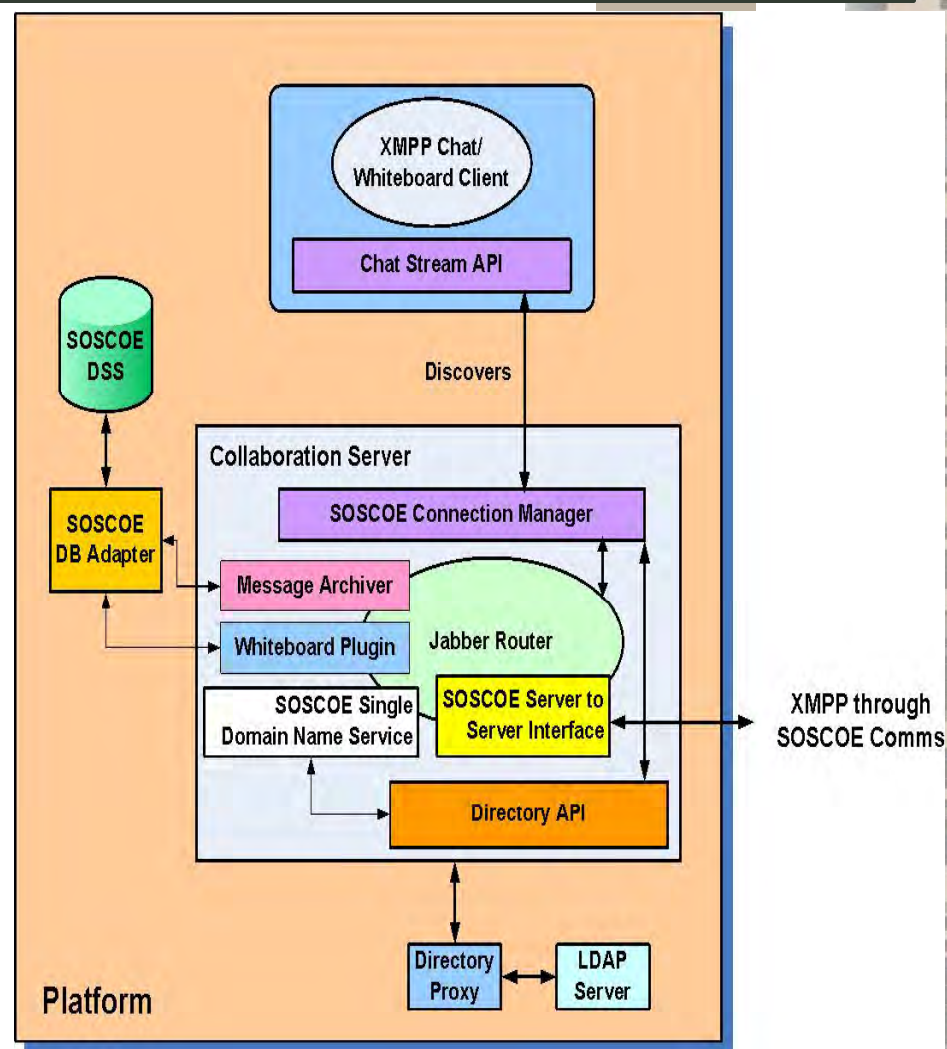
**MS Tools + Java Support + Security + safety critical support + Quality Architecture = Deployable Software Systems**



# Collaboration Services Design

## Chat Software Component Overview

- Provides multi-server chat services
- Sub-components
  - Chat Stream API
    - Client interface to Chat Server
  - Chat Server (Collaboration Server)
    - Presence Mgmt Support
    - Instant Messaging
    - Create and Delete chat room
    - Manage chat participants
    - Manage message exchange (XMPP)
    - Archive messages
    - B 10.2 Updates
      - Add support for XMPP data types
      - Update Status Code
      - Remove dependence on Policy Services
      - Enable Cross-Domain routing
  - Note: Chat uses Directory API from Admin Services
    - Create, Delete, Update, and Search Chat Users



**Chat interacts with Directory Services from Admin Services**