



15th ICCRTS: *The Evolution of C2*

Coalition Networking in a Service Oriented Architecture Environment

Track 3: Information Sharing and Collaborative Processes and Behaviors

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Mr. Martin Jordan—Space and Naval Warfare Systems Command

June 23, 2010

"Is there a place for small navies in network-centric warfare? Will they be able to make any sort of contribution in multinational naval operations of the future? Or will they be relegated to the sidelines, undertaking the most menial of tasks, encouraged to stay out of the way—or stay at home... The 'need for speed' in network-centric operations places the whole notion of multinational operations at risk."

General James Mattis

Commander U.S. Joint Forces Command

Professor Paul Mitchell

2010 Joint Warfighting Conference

"Small Navies and Network-Centric

May 13, 2010

Warfare: Is There a Role?"

Naval War College Review

Spring 2003



Outline

- ▼ Global Maritime Partnership (GMP) Imperatives
- ▼ U.S. Navy Leading
- ▼ Specific Examples
- ▼ Way Forward

GMP Imperatives

“Global Maritime Partnerships are setting the standard for international cooperation, in our globalized world and they are an important element to achieving stability in the global commons upon which we all rely.”

Admiral Gary Roughead

Chief of Naval Operations

22nd Surface Navy Association National Symposium

January 14, 2010



GMP Imperatives

- ▼ Key U.S. national security and defense policy documents call for urgent requirement for coalition interoperability
- ▼ U.S. Maritime Strategy put forward the Global Maritime Partnership as an important imperative
- ▼ A top priority request from fleet commanders—coalition communications
- ▼ Recognized as important by coalition partners

U.S. Navy Leading

“Our ability to sustain these alliances, and to build coalitions of support toward common objectives, depends in part on the capabilities of America’s Armed Forces. Similarly, the relationships our Armed Forces have developed with foreign militaries are a critical component of our global engagement and support our collective security.”

U.S. National Security Strategy
May 2010



U.S. Navy Leading

- ▼ Naval forces are often the first on scene in an international crisis and often provide the core network for others

- ▼ U.S. Navy leading the U.S. effort to solve coalition networking challenges
 - International organizations like the AUSCANNZUKUS partnership and TTCP
 - Partnership-building activities like Trident Warrior

- ▼ However, uneven technological development leads to critical gaps in coalition interoperability

Specific Examples: Service Oriented Architecture (SOA)

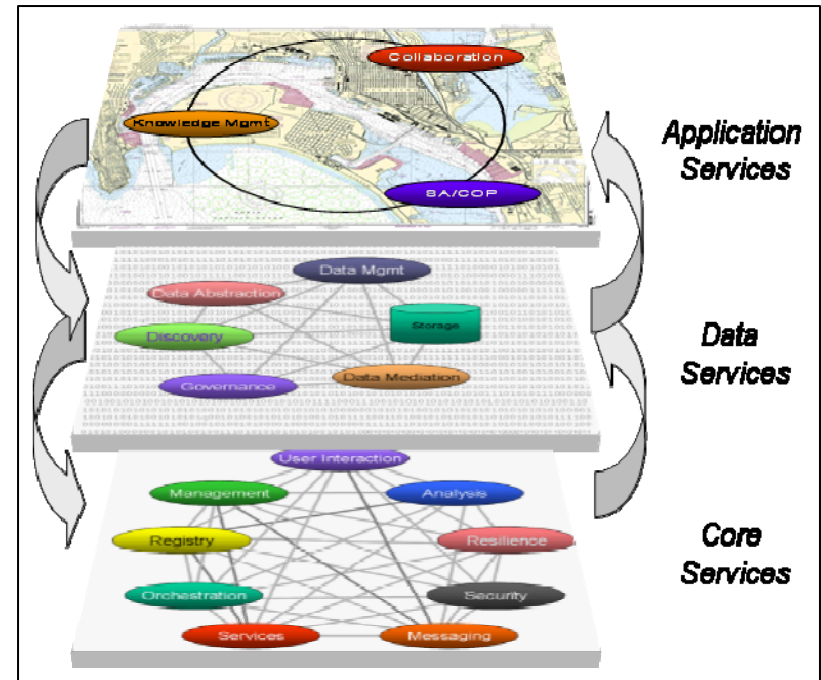


The U.S. Navy and SOA

- ▼ The U.S. Navy has embarked on an ambitious program to develop a fully networked force and to operate in a Service Oriented Architecture (SOA) environment
 - To serve Navy and Joint needs
 - To enable effective coalition networking at sea
- ▼ The evolution towards SOA is driven by three major initiatives:
 - Consolidated Afloat Network Enterprise System (CANES) – which will enhance C4 delivery by leveraging SOA
 - Consolidated Net-Centric Data Environment (CNDE) – which will provide overarching data management, fusion, and governance for the Fleet
 - Navy involvement in the Joint Multi-service SOA Consortium
 - Rationalizes SOA efforts between the US services
- ▼ Proactive engagement with Allied/Coalition partners
 - Exploring how to best leverage investments in net-centricity and SOA
 - Enhancing effectiveness to make the Global Maritime Partnership a reality

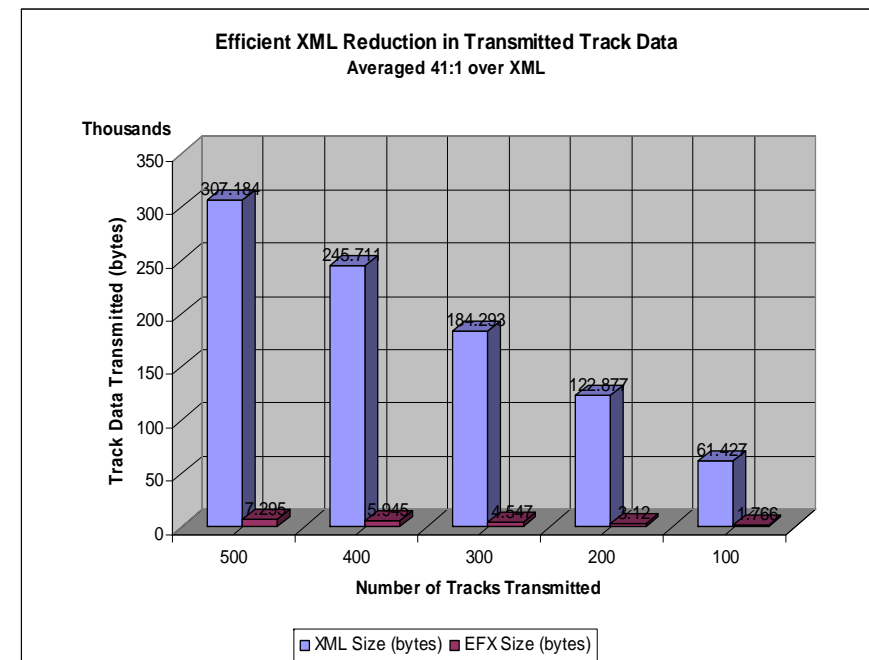
The Coalition C4 SOA Model

- ▼ Consists of three layers
 - Application Services
 - Data Services
 - Core Services
- ▼ Application Services are implemented for communities of interest on top of a data services layer
- ▼ The Data Services layer includes support for data discovery, understanding, formatting, fusion, and other features
- ▼ A SOA Core Services layer provides the basic services
 - Discovery
 - Messaging
 - Mediation
 - Identity management
 - Security
 - Other basic services



Critical Technical Challenges for SOA

- ▼ Successful implementation and sustainment requires
 - Development of a technically sound, robust and interoperable metadata and evolution management strategy
 - Definition and standardization of a common and interoperable suite of web services
 - Implementing SOA messages that supports the scalability requirements of services
 - SOA “chattiness” must be carefully controlled in the tactical environment
- ▼ Capability of SOA to operate in a low-bandwidth, high-latency networking environment relative to the Enterprise core networks for which SOA has been developed
- ▼ Efficient XML may be a low-bandwidth enabler





Critical Operational Challenges

- ▼ Of critical importance from the operational community are the identification, scope and description of Defense “business practices” that need to be implemented in a SOA
- ▼ A proper SOA environment for the coalition must include
 - Discovery and Directory Services shared between nations – not just “White Pages”
 - UDDI registry for National and Coalition networks
 - Identification of operational Content Providers and expected products
 - Service Orchestration and Mediation requires standardization of work flows and business practices within the Joint and Coalition communities
 - Addressing all aspects of SOA Security
- ▼ Knowledge of these key warfighter requirements is critical in directing the efforts of the technical community



The Shift to Distributed Applications and Services

- ▼ For SOA to fully exploit the capabilities of a networked force, a shift in the architecture and configuration of communication and application services is required
- ▼ Today, with rare exceptions, applications and network services are homed at the Network Operations Center (NOC) or Data Center
 - Requires the operator to reach back to shore for all services
 - Even with direct ship-to-ship network connectivity, these services still require reach-back to shore facilities
- ▼ The increased robustness and agility required for coalition network-centric operations requires a significant shift in C4 architectures
 - Single points of failure a shift in the architecture and configuration of application services is required must be removed
 - Must include ship-shore, as well as ship-ship networking systems
 - Centralized and monolithic services must be transformed into distributed service modules that can be rapidly recomposed as required
- ▼ Within the AUSCANNZUKUS navies, C4 experimentation in Trident Warrior has validated the requirement for distributed applications and network services and the need for SOA to push the data out to the warfighter as far forward as possible

Way Forward

“Information sharing is a fundamental requirement for meeting most of the current challenges to international maritime security. The notion of a regional maritime partnership in the American continent and the Caribbean demands effective information-sharing capabilities in order to become a reality.”

Commander Alberto Soto
Chilean Navy

“Maritime Information-Sharing Strategy”
Naval War College Review
Summer 2010

Since 2002, the Technical Cooperation Program has focused the efforts of its Maritime Systems Group (MSG) on “Networking Maritime Coalitions” and “FORCEnet and Coalitions Implications.” The MSG has become an important link among national naval C4ISR acquisition programs ... For that very reason these [Latin American and Caribbean nations] should tenaciously strive to become involved in initiatives like MSG.”

**Commander Alberto Soto
Chilean Navy**

**“Maritime Information-Sharing Strategy”
Naval War College Review
Summer 2010**

Questions?