Beyond PowerPoint Deep

A Concept of Operations for Implementing Net-Centric Warfare

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Presentation Goal

...provide “a means” (i.e., not necessarily “THE means”) by which NCW could be implemented within DoD...
**NCW Terms of Reference**  
**“How to win at NCW Bingo”**

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NCW Terms of Reference

• **Service-Oriented/Service-Based Architectures:** (informal definition) business-to-business, web-based applications; usually rely on a great degree of trust between service provider and user

• **Community of Interest (COI):** the collection of people that are concerned with the exchange of information in some subject area
  – COIs can be organized around any group with a common interest, or in the case of the military, common mission
  – COIs are not mutually exclusive; one can be a member of several COIs at the same time
  – COIs provide the groupings by which Service-Oriented Architectures are designed

Sources:
A Community of Interest Approach to Data Interoperability
Scott A. Renner, Ph.D.
http://www.mitre.org/work/tech_papers/tech_papers_01/renner_community/index.html
http://www.w3.org/TR/2004/NOTE-ws-arch-20040211/#service_oriented_architecture


**NCW Terms of Reference**

- **Task, Post, Process, Use (TPPU):**
  - Basic NCW Tenet: info consumers are smarter than their sources about what is operationally needed “NOW”
  - Term derived from Intel TPED (Task, Process, Exploit, and Disseminate)
    - Process was often criticized for providing information too late for operational use
  - Implications:
    - Information derived from collections will be posted for community use prior to processing and exploitation via use of “Smart Push/Pull” technologies (i.e., Publish/Subscribe)
    - Enables community users to make use of “raw information” as it becomes available

Source: TPPU, the New Paradigm (DISA GIG NCES Website)
http://ges.dod.mil/about/tppu.htm
NCW Terms of Reference

- **Publish/Subscribe**: a process by which data is distributed inter- and intra-COI
  - “Smart,” filtered push of information is based on filters selected by the user during subscription process
    - Subscription process: both ad-hoc, and role-based de-facto
  - “Civilian world” examples include automated stock ticker, news, and weather reporting programs:
    - Pointcast, Infogate (stocks)
    - NBC4 E-Mail News Headlines
    - WeatherBug
- Subscription Types:
  - New Information Available: provides link to information instead of the actual information - enables “Smart Pull” of information when user is ready to use it
  - Deliver Upon Creation: delivery of information upon creation by either the creator of the information, or an intermediate distributor (“Smart Push”)
NCW Terms of Reference

• **Portal**: A site featuring a suite of commonly used services, serving as a starting point and frequent gateway to the Web (Web portal) or a niche topic (vertical portal).
  – Civilian web portal services often include a search engine or directory, news, email, stock quotes, maps, forums, chat, shopping, and options for customization.

• **Enterprise Knowledge Portal**: goal-directed toward knowledge production, knowledge integration, and knowledge management

Sources:
Marketing Terms.com
http://www.marketingterms.com/dictionary/portal/
Implementing Enterprise Knowledge Portals
http://www.dkms.com/ekpcons.htm
NCW Terms of Reference

• **Catalog:** contains indexed information allowing for referencing all information available in the COI, to include subordinate COIs
  – Catalogs will use XML (or other means of semantic tagging) to describe the contents of information available to the COI (i.e., metadata)
  – Schema for multi-COI catalog distribution is required for catalog alignment and update
    • For purposes of this discussion, catalogs propagate hierarchically (Platform => Mission COI => Operational COI=> Theater COI)
  – Smart information staging will also occur

Key point: despite what you’ve heard about NCW… NCW does not mean “all the data is everywhere, all the time”- information is discoverable, but not “everywhere”
• **Metadata**: “data about data.” Information by which artifacts are cataloged and stored.

• **DISA Vision – 4 catalogs based on “pages:”**
  - **White**: who
  - **Yellow**: what
  - **Brown**: how data stored (format considerations)
  - **Green**: security/classification requirements (think “behind the green door”)

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**Source:**
Briefing: “Market-Driven Data Management”
Dawn Meyerriecks
Chief Technology Officer
Defense Information Systems Agency
Assumptions

- NCW will be enabled by COI-based Enterprise Knowledge Portals (herein referred to as Portals)
  - Will require *lots* more governance regarding COIs...
- In order to provide for “a degree of self-synchronization” as called for by Alberts/Gartska:
  - Each COI must have some degree of self-determination
  - Thus, each COI has some degree of “self C2”
- Decision aids enabled by NCW Portal-based paradigm should be driven by the “Command by Negation” premise
  - No machine can know everything – keeps the “human in the loop”
  - Enables critical, life-threatening decisions to be made automatically
Assumptions

• All DoD organizations will use some subset of the Net Centric Enterprise Services (NCES) Core Enterprise Services (program began in 2004):
  • Domain Name Service (DNS)
  • Messaging Services
  • Discovery Services
  • Brokering Services
  • Collaboration Services
  • Application System Management (ASM) Services
  • Security Services
  • Storage Services

Sources:
“Net Centric Enterprise Services – What Problem are we Trying to Solve?” Dawn Meyerriecks
http://ges.dod.mil/articles/netcentric.htm
Briefing: “NCES Net Centric Enterprise Services,” Rob Vietmeyer/DISA APC
Assumptions

• Despite access and bandwidth being managed through the COI, separate networks will still exist
  – Separate communications channels will likely be maintained for tactical use
  – Concrete example: time critical operations where unobstructed access to communications are vital to mission success
  – Endgame: despite this being “out there,” it will need to coexist with other tactical networks
OK... So How Does NCW Work?

- Note: this is a CONOPs for the “ghost in the machine” rather than what the user sees...

- Central to all operations is the COI Portal, each of which performs the following operations:
  - **Search**: queries COI catalogs based on “pages” (White/Yellow/Brown/Green) metadata
  - **Retrieval**: retrieves info from COI datastore or COI asset datastores
  - **Publish/Subscribe Management**: manages...
    - Subscription profiles
    - Servicing of subscriptions
    - COI Catalog management:
      - Records advertisements of new data available
      - Synch catalogs with higher echelon COIs
OK… So How Does NCW Work?

• **COI Portal Operations (cont.):**
  - **Collaboration Management:** provide and manage means for collaboration (bandwidth, etc.)
  - **Common Tools:** COI-common tools
    - NCES Core Enterprise Services “Plus”
    - May exist in the portal, or external to the portal as services
  - **Bandwidth Management:** manage bandwidth internal to, and at the interface to the COI
OK... So How Does NCW Work?

- **External Entities**: access all COI information through the Portal
- **Security Management**: Can be either internal or external to the COI
  - Provides information used in building and verifying profiles
    - Subscription
    - Access to COI information (via Search/Retrieval)
OK... So How Does NCW Work?

- **Publish/Subscribe Management:**
  - Manage Subscription Profiles
  - Service Subscriptions: Match incoming information to subscription profiles – generate alerts or “smart push”
  - Catalog Management: recording/propagation of catalog info
OK… So How Does NCW Work?

• **COI Assets:**
  – Producers of information that changes within the COI:
    • “Heartbeat”/Asset Status Information: fuels, munitions, position, etc.
    • Ad hoc changes: sensor has new data, system/subsystem failure, etc.
    • Each Asset has Datastore: potential for COI-wide use beyond asset (info redundancy, etc.)
OK... So How Does NCW Work?

- **Collation and Fusion:**
  - Collates/Fuses asset status information – stores info in COI Enterprise Datastore
  - Can fuse individual products created by COI Assets into new products
OK... So How Does NCW Work?

Decision Loop

- **Observe**
- **Orient**
- **Decide**
- **Act**

**C2 Function**

**Security Management**

- Security Profiles

**Publish/Subscribe Management**

- Subscription Profiles

**COI Portal**

- Search & Retrieval
- Publish/Subscribe Management
- Collaboration Management
- Common Tools (Services)
- Bandwidth Management

**COI Catalog**

**COI Enterprise Datastore**

**COI Asset**

- Asset Datastore

**Collation and Fusion**

**Command Net**

**Data Net**

**External Entities**

- Higher Echelon COIs
- Catalog

**Security Management**

- Enterprise Datastore

- COI Asset Datastore
OK... So How Does NCW Work?

- **COI C2**: enable self-organization to maximize use of assets
  - Enables C2 decision aids:
    - COI-controlled assets can be directly tasked; asset WILCO’s/CANTCO’s
    - Assets shared with other COIs may be requested
  - Command Net notionally separate from Data Net
Self Synchronization of COIs
Tactical Mission Example

- MSN Planning → COI Join
- System/Subsystem Failure
- Asset Problem
  - Asset Aborts
  - Asset Destroyed
  - Asset Damaged
  - Asset Needs Fuel etc...
- Determine Effects on MSN
- Redistribute Taskings and Continue
- Accept Risk and Continue
- End/Abort Mission
- ROE Change
- Unexpected Wx/Environment Conditions
- Emerging Targets etc...
- Mission Altering Events
- Steady State
Self Synchronization of COIs
Tactical Mission Example

- **Events of Interest:**
  - **MSN Planning:** where COI membership, profiles, frequencies, addresses, etc. are recorded/determined for the mission (the “devil in the details” lives here…)
  - **COI Join:** status of assets determines ability to accomplish assigned missions
    - No: a C2 Decision/task reapportionment structure is entered
    - Yes: enter Steady State
  - **Steady State:** MSN executing according to plan (old or revised)
  - **Events Requiring C2 Decision:** these are events that either add more tasks to the current prioritized list, or remove assets to execute them
    - Effects on mission are determined; one of 3 outcomes
      - Abort/End Mission
      - Taskings Redistributed and return to Steady State
      - Risk is accepted => return to Steady State
NCW for Dummies

A Reference for the Rest of Us!

by George Yougott
bestselling Author of
The OODA Loop for Dummies

The Easy and Fun Way to Understand
Cognitive, Information,
and Physical Domains!

Your Metadata Medic

Learn how to befuddle
Operators with NCW-
speak!