



**WBB CONSULTING**

*Solutions and Support for a Changing World*



# ***Beyond PowerPoint Deep***

**A Concept of Operations for Implementing  
Net-Centric Warfare**

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**Lawrence P. McCaskill**  
[lmccaskill@wbbinc.com](mailto:lmccaskill@wbbinc.com)



# Presentation Goal

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**...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”

<b>NCW BINGO</b>				
<b>NCW</b>	<b>COI</b>	<b>SBA/ SOA</b>	<b>XML</b>	<b>Metadata</b>
<b>TPPU</b>	<b>Publish</b>	<b>Subscribe</b>	<b>Portal</b>	<b>EKP</b>
<b>Catalog</b>	<b>B2B</b>	<b>FREE SPACE</b>	<b>Swarming</b>	<b>WSDL</b>
<b>SOAP</b>	<b>Horizontal Fusion</b>	<b>Self Organizing</b>	<b>Collaboration</b>	<b>Monitoring</b>
<b>Shared Awareness</b>	<b>Sense- making</b>	<b>Mangement &amp; Synchronization</b>	<b>IPv6</b>	<b>VPN</b>



# NCW Terms of Reference

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- **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.htm](http://www.mitre.org/work/tech_papers/tech_papers_01/renner_community/index.htm)

[http://www.w3.org/TR/2004/NOTE-ws-arch-20040211/#service\\_oriented\\_architecture](http://www.w3.org/TR/2004/NOTE-ws-arch-20040211/#service_oriented_architecture)



# NCW Terms of Reference

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- 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/topu.htm>



# NCW Terms of Reference

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- **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

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- **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

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- **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

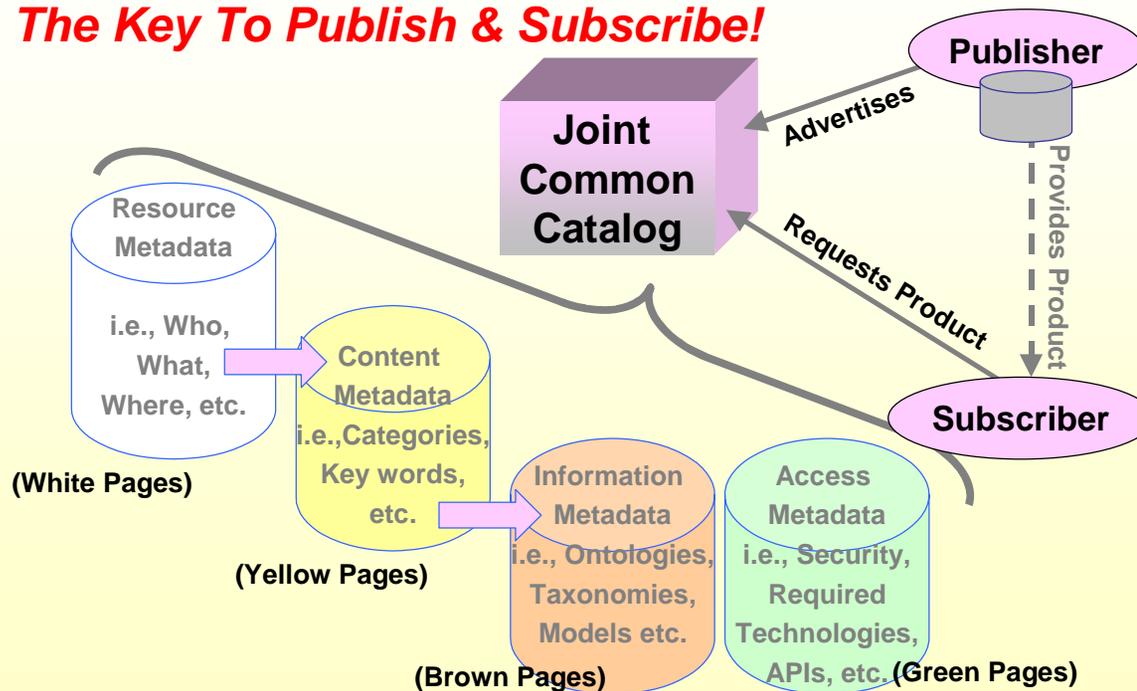
**Key point:** despite what you've heard about NCW... NCW *does not* mean "all the data is everywhere, all the time"- information is discoverable, but *not* "everywhere"



# NCW Terms of Reference

## Run-Time Electronic Market Joint Common Catalog (JCC)

### The Key To Publish & Subscribe!



UNCLASSIFIED

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- **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”)



# Assumptions

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- **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

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- **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  
CTO, DISA, Military Information Technology, online edition, Volume 7, Issue 3,  
March 2003 <http://ges.dod.mil/articles/netcentric.htm>

Briefing: "NCES Net Centric Enterprise Services," Rob Viemeyer/DISA APC



# Assumptions

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- **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?

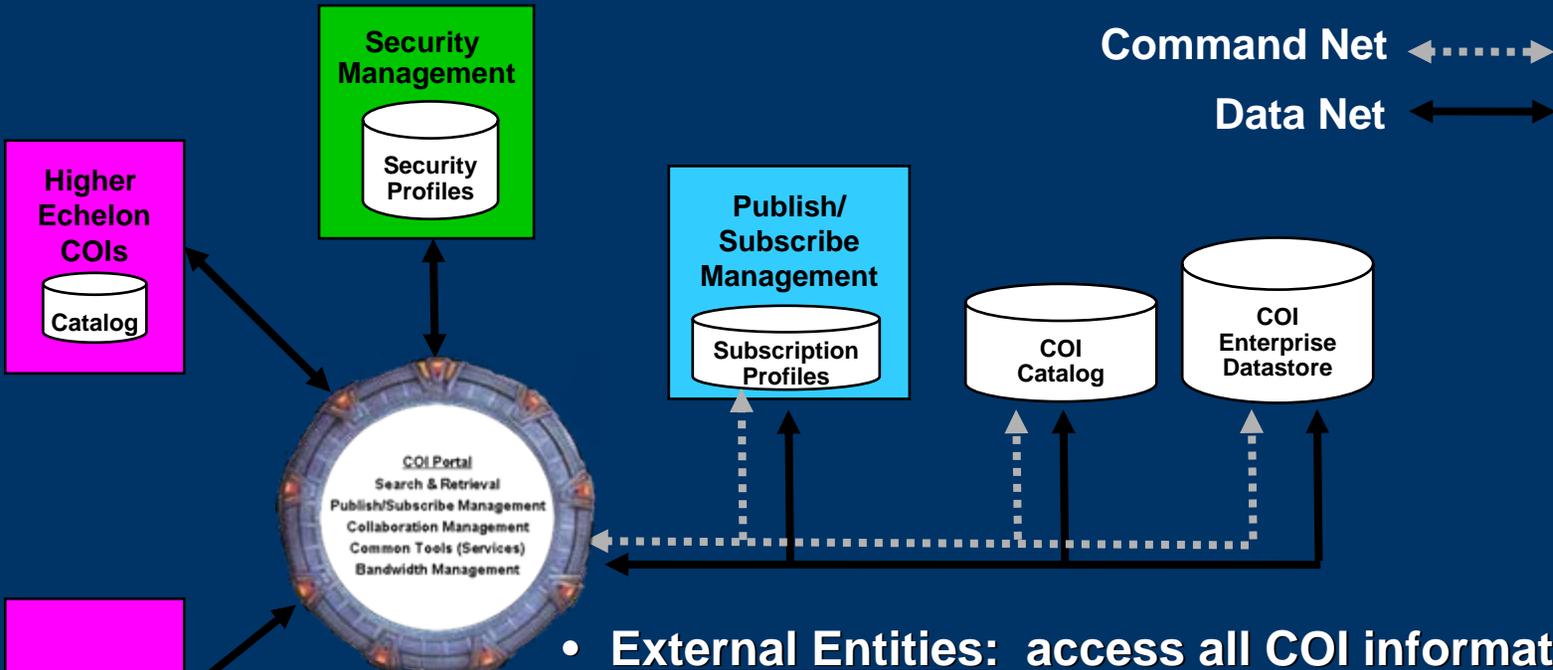
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- **COI Portal Operations (cont.):**
  - **Collaboration Management**: provide and manage means for collaboration (bandwidth, etc.)
  - **Common Tools**: COI-common tools
    - NCES Core Enterprise Services “Plus”
    - May exist in the portal, or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



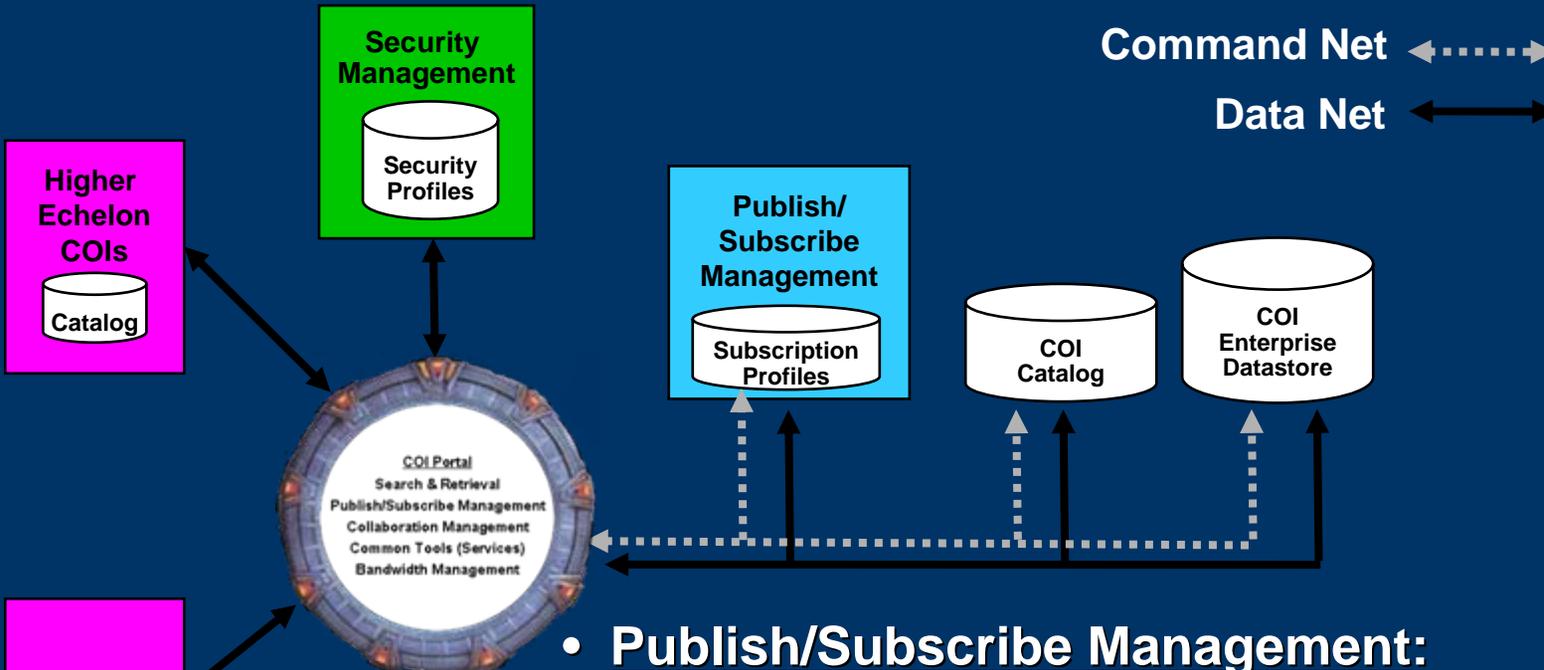
# OK... So How Does NCW Work?



- 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)



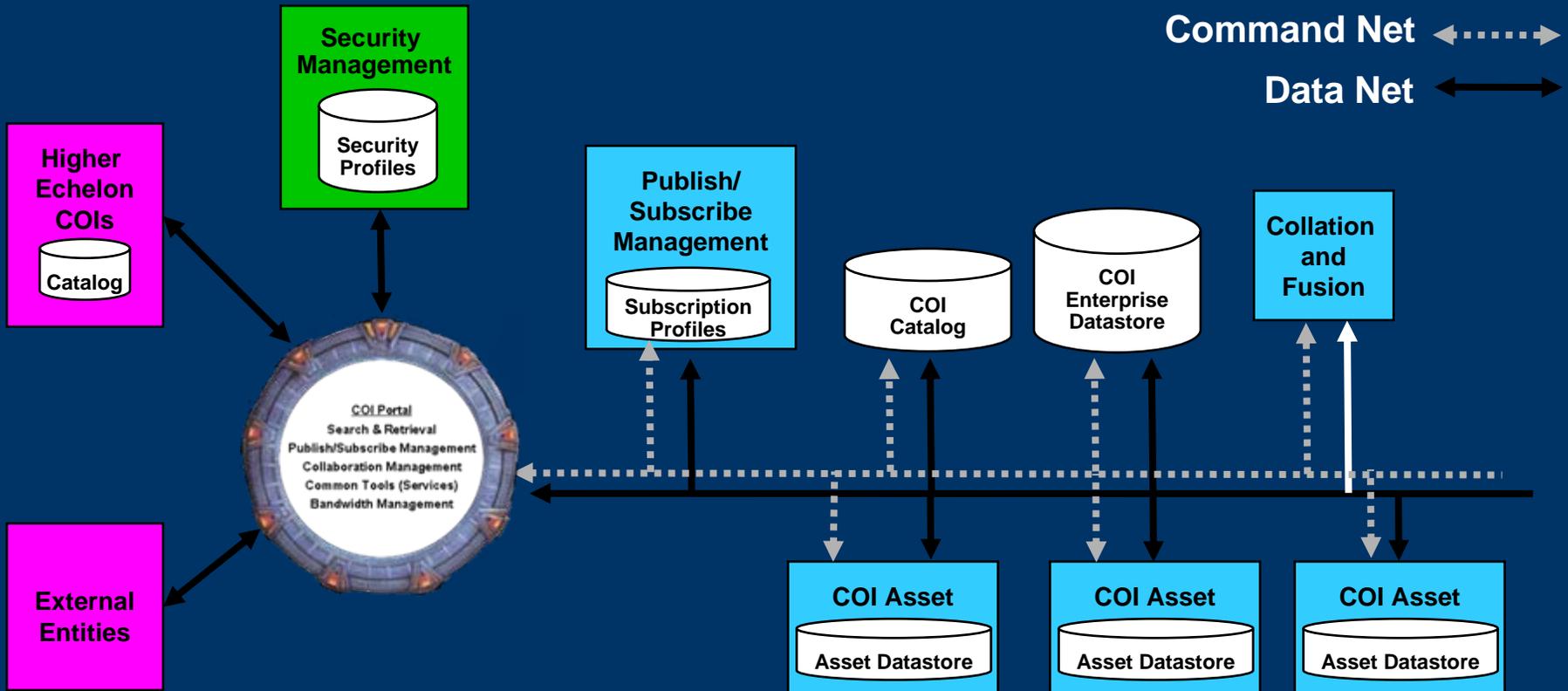
# OK... So How Does NCW Work?



- 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?



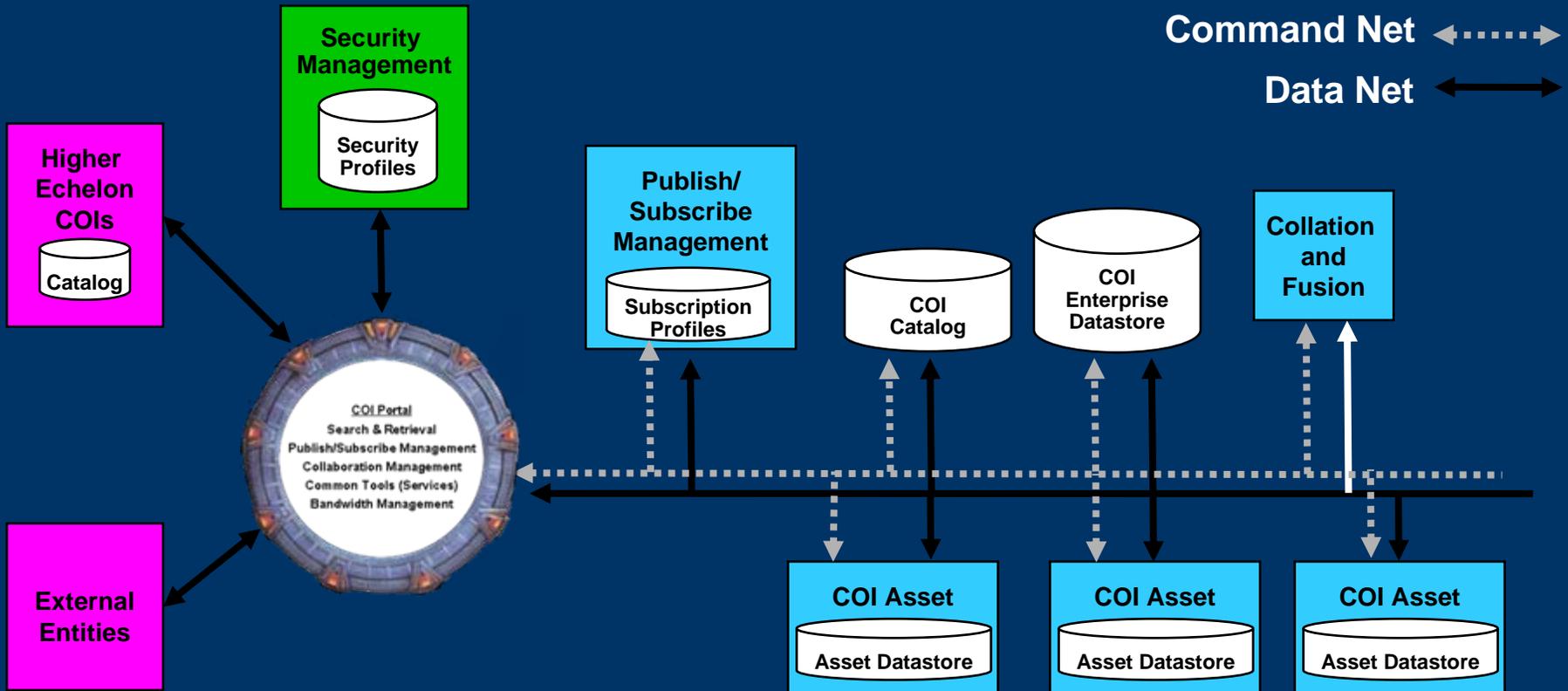
## • COI Assets:

– 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?



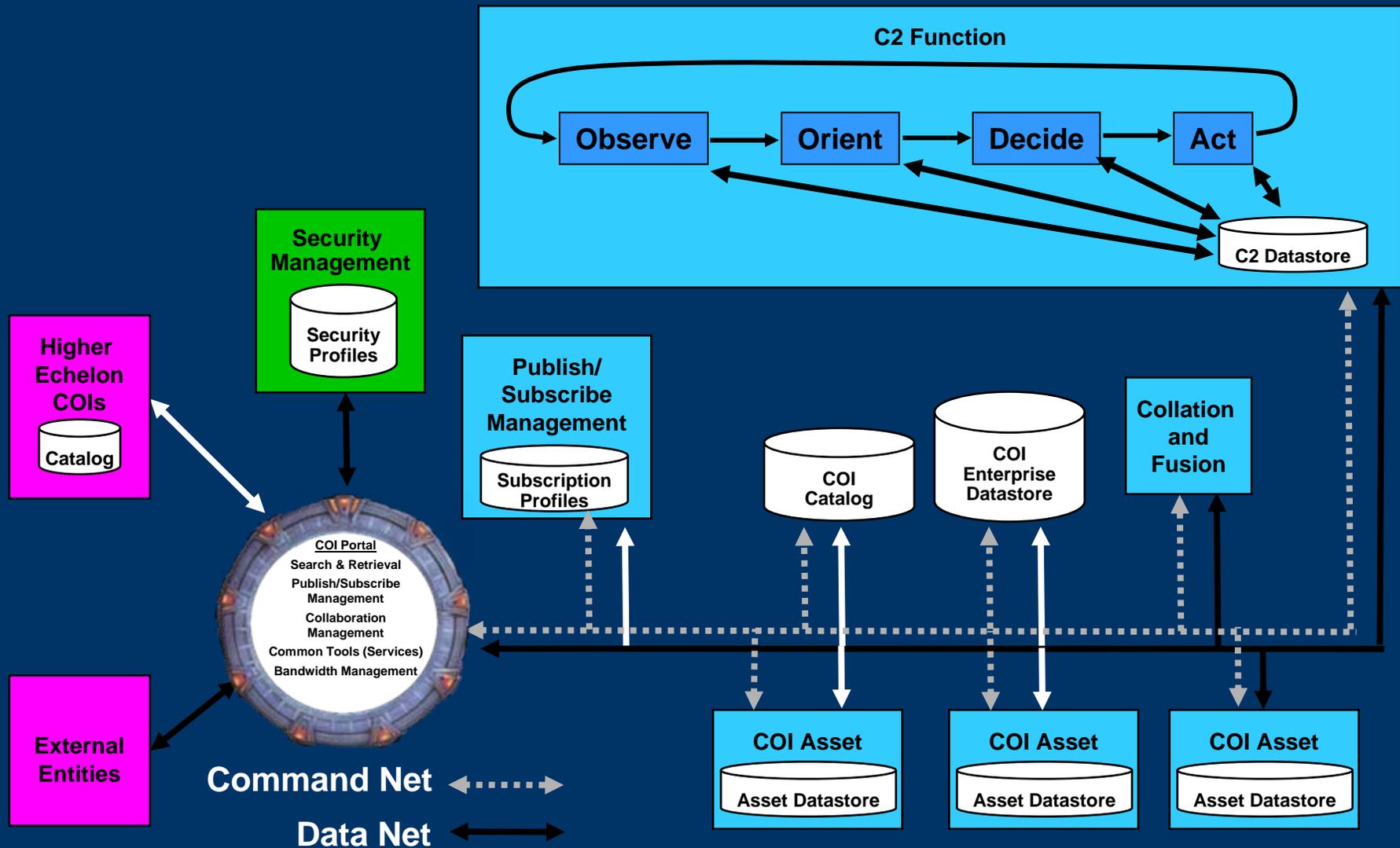
- **Collation and Fusion:**

- Collates/Fuses asset status information – stores info in COI Enterprise Datastore
- Can fuse individual products created by COI Assets into new products



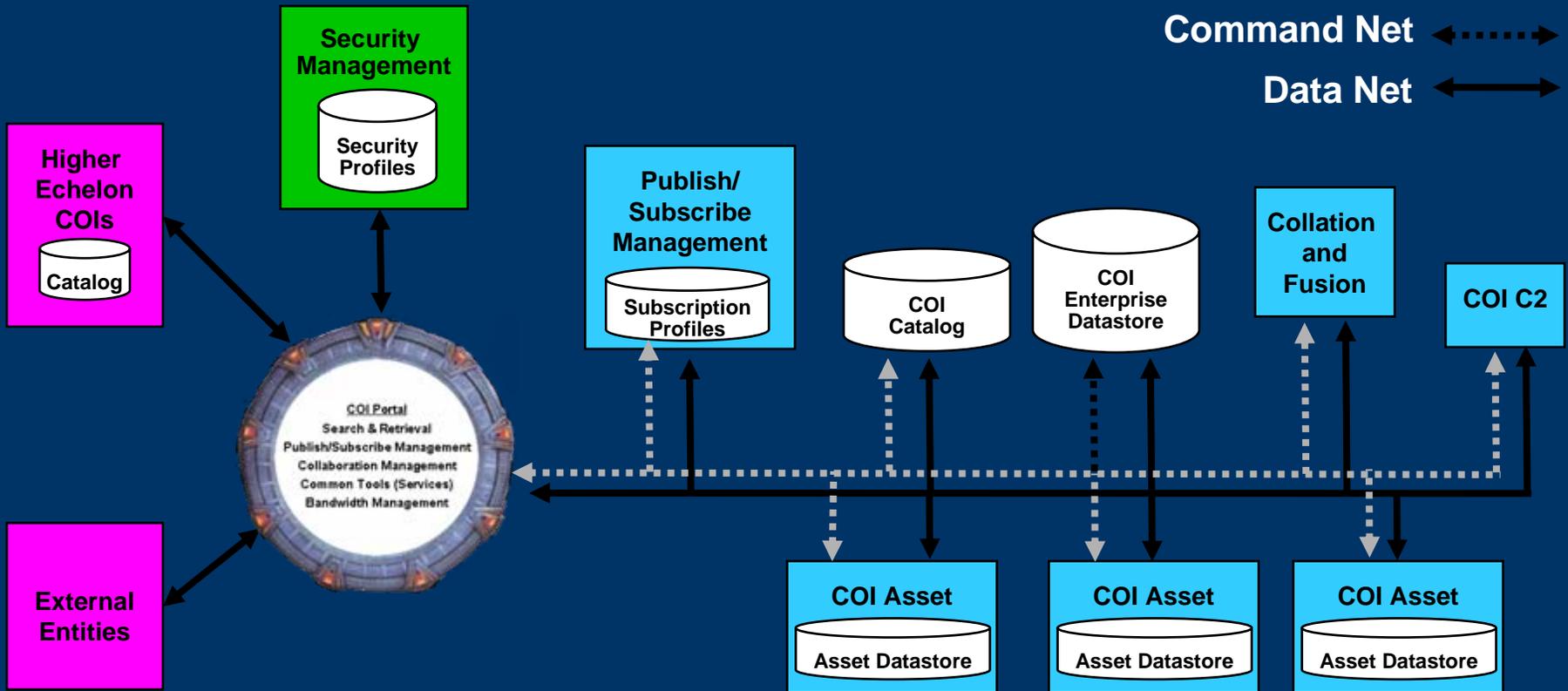
# OK... So How Does NCW Work?

## Decision Loop





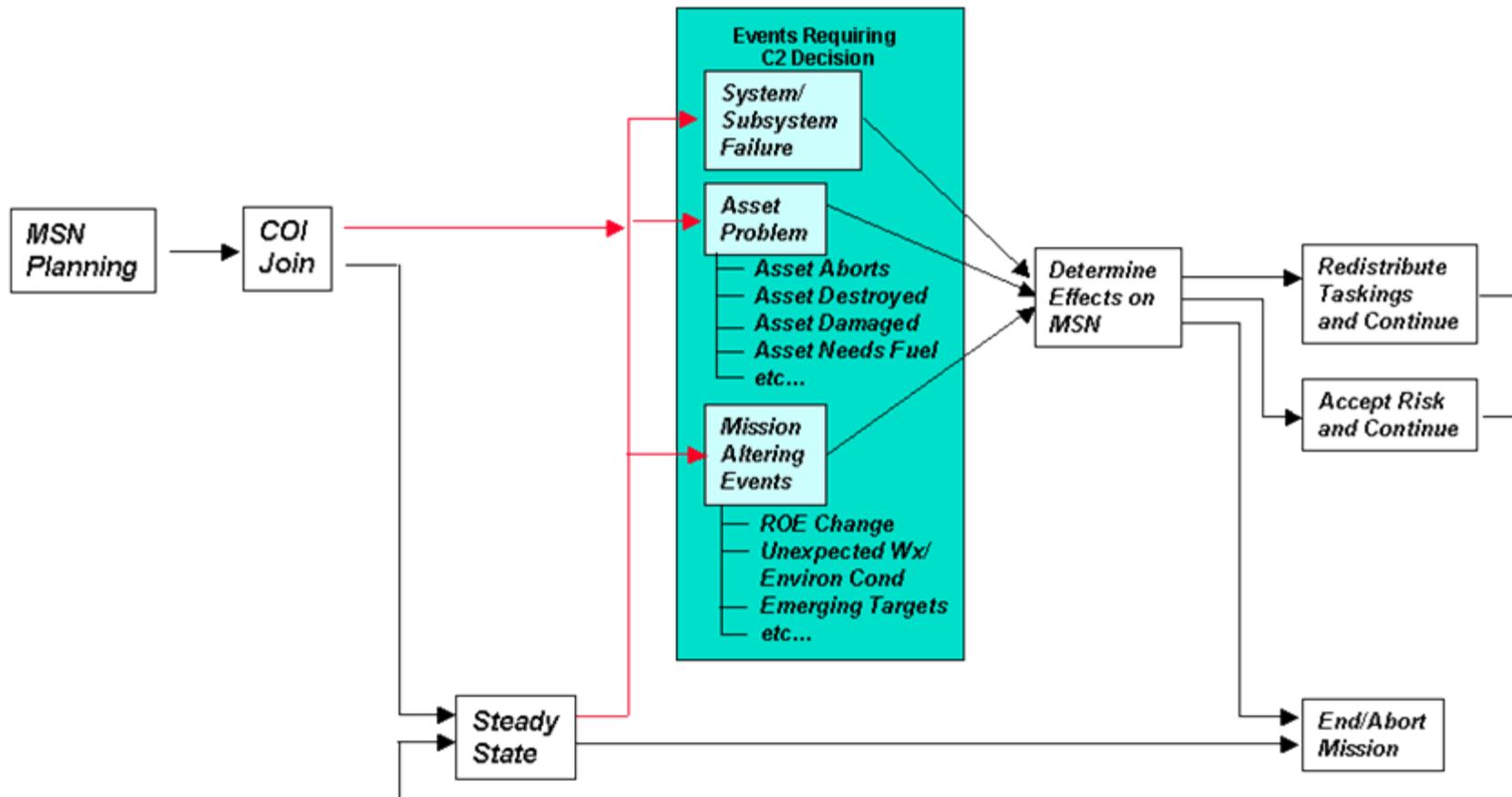
# OK... So How Does NCW Work?



- **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



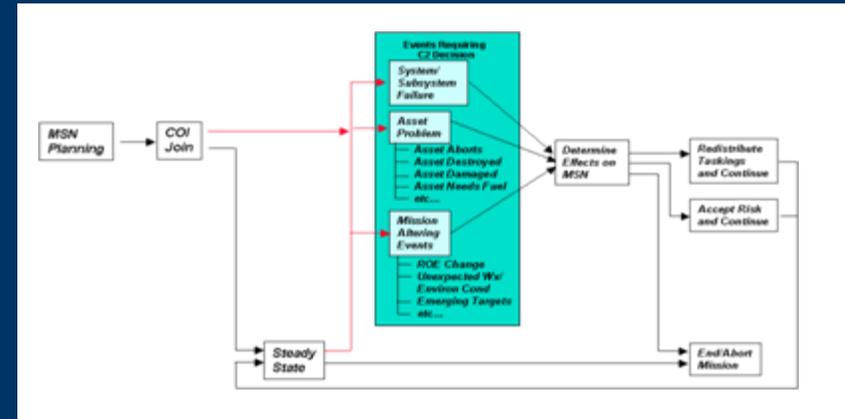


# Self Synchronization of COIs

## 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...)



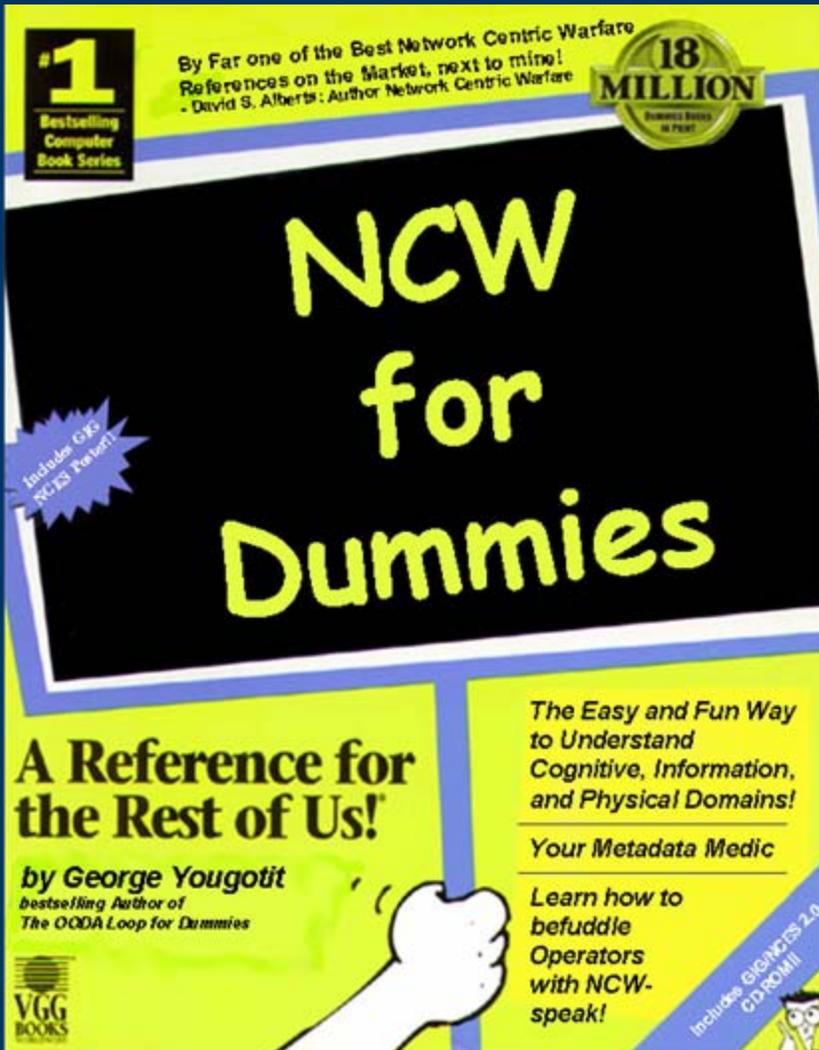
- COI Join: status of assets determines ability to accomplish assigned missions

- 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



**Questions?**