NNEC and SOA within the NATO CWIX 2010

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It is widely recognized and well known that NNEC aims to achieve and maintain information superiority in a complex scenario like net-centric, or as I prefer to call it, information-centric operations. Even if the network or the transport layer plays a very important role, what really counts is the centrality of information in all its connotations.

One of the major factors in enabling a net-centric transformation strategy, particularly in the interaction and interoperability of the C4-ISR systems, is the use of the emergent new technological paradigm called Services-Oriented Architecture (SOA).

There are several different definitions of SOA. Generally speaking, SOA is a flexible set of design principles used during the phases of system development and integration. Upon deployment, a SOA-based architecture will provide a loosely-integrated suite of services that can be used within multiple business domains. SOA also generally provides a way for consumers of services, such as web-based applications, to be aware of available SOA-based services. For example, several disparate C4-ISR systems within an Operation (i.e. ISAF) may develop and deploy SOA services in different implementation languages, and their respective clients use a well understood, well defined interface to access them. XML is commonly used for interfacing with SOA services, though this is not required.

Practically applying the SOA paradigm to the C4-ISTAR world is “revolutionary” because it is a sector with no defined or agreed upon rules. SOA applications, even if it is commercially well-known and theoretically standardized, it still has to be “digested” by the military world at all levels (from tactical to strategic). However, for C4-ISTAR systems to make the jump to NNEC through SOA they will need much more implementation, verification and acceptance

During the NATO CWID 2009 exercise, the SOA Focus Groups was formed and to provide a forum for collaboration among the NATO Nations concerned with transforming their systems from a joint C4-ISR NNEC / SOA perspective. Two major results were achieved during the exercise:

- Harmonization, coordination, test and validation of:
    - Web 2.0 related technologies
    - Semantic Web/Interoperability Technologies
    - Web Services for Tactical and Operational Near Real Time Information
    - IEG (information exchange gateway) and XML guards in the SOA perspective / Services Security
    - Service Bus as an Alliance mediation element among systems
    - Service Registry as an Alliance federation element
    - SOA within C4-ISR as a transformation key element

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- Proof of concept of:
    - Operational Value of several “core” functional web services such as Geo-Information Services, track dissemination and so on
    - Web Services effectively demonstrated how they can solve many interoperability issues and/or gaps simplifying the way to exchange information even among unanticipated partners/systems.
    - Some Nations/Trials truly demonstrated their great efforts in evolving their C4-ISR systems toward NNEC through SOA adoption.

- NATO CWIX Management Team continues to support the SOA Focus Group to achieve, where possible:
    - SOA related initiatives coordination and harmonization to maximize the final result making the most effective participation
    - Harmonization of SOA initiatives/Trials into an Operational scenario in order to prove unquestionably “on the field” the operational capabilities of these technologies.

As in previous exercises, CWIX 2010 foresees the involvement of many nations and many C4-ISR systems working to achieve interoperability solutions based on the aforementioned SOA paradigm. Many initiatives related to interoperability and the ability to federate service registries. Semantic Interoperability interfaces will also be featured in the upcoming exercise period.

An environment such as the NATO CWIX represents the best opportunity for advancement and a veritable breeding ground of ideas to put into practice and validate either the technology, the operational procedures or, above all, the standards which need to be better defined especially in this field. SOA engineers from the leading nations as well as from the NATO agencies meet at the CWIX conference to present new ideas and then convene during the exercise period to test and experiment.

I conclude this article with a quote from Mr. Alan Kay[2]. His thoughts are impressive and I believe this statement reflects well the views presented within this article: *The best way to predict the future is to invent it*.

[2] **Alan Curtis Kay** (born May 17, 1940) is an American computer scientist, known for his early pioneering work on object-oriented programming and windowing graphical user interface design, and for coining the phrase,