

## SOA foundation for Network Centric Operations



Photo credits on back cover.

---

### Highlights

---

- ***Combines robust, best-of-breed IBM software with technology and industry-specific services to enable military organisations to speed up their netcentric transformation***
- ***Allows Defence organisations to reap the benefits of commercial innovation, and, in particular of service orientation, so that they can more quickly focus on achieving Information Superiority***
- ***Helps ensure the right information is available in the right place at the right time to help achieve mission success***

### Challenges faced by modern military

Military forces confront a complex and ever-evolving set of challenges, as characterised in Table 1. In an economic climate of static or shrinking Defence budgets, they are looking to achieve and exploit Information Superiority to “observe, orient, decide and act” faster than their adversary. Whilst Information Superiority is a central theme, it is far from simple to achieve. Today’s battlespace is awash with data and information obtained by advanced sensor systems, combined with open-source and human intelligence.

The challenge is to ensure the right information is available in the right place at the right time to support the commander’s intent and achieve mission success. In the past, this data and information have existed in “silos.” For example, logistics information was often separated from operations information and was extremely difficult to overlay and depict on a tactical picture. To meet this challenge, the modern military is adopting the principles of Network Centric Operations (or Network Centric Warfare) and increasingly looking to leverage commercial innovation to accelerate their transformation to netcentricity.

**Table 1: Evolving challenges for the military**

<i>Evolving threat</i>	<ul style="list-style-type: none"> <li>• Global War on Terror</li> <li>• Asymmetrical warfare on multiple fronts, increasingly sophisticated enemy</li> </ul>
<i>Different mission types</i>	<ul style="list-style-type: none"> <li>• Increased range of mission types – peacekeeping, stabilisation, humanitarian aid, evacuation, nation building, anti-drug and high-intensity conflicts – seeking a diverse range of effects</li> </ul>
<i>Increased collaboration</i>	<ul style="list-style-type: none"> <li>• More multinational coalition operations</li> <li>• Increased collaboration with external agencies (e.g., police, intelligence, aid)</li> </ul>
<i>Improved technology</i>	<ul style="list-style-type: none"> <li>• Technological enhancements that have increased coalition and enemy capabilities (e.g., enemy networked via Internet and phone)</li> </ul>

### A technology challenge and more

This journey to netcentricity is underpinned by a technological change, but this can only be turned into optimum mission benefit if an organisation’s people and processes also evolve. This journey is illustrated in Figure 1.

A prerequisite for netcentricity is to improve an organisation’s ability to share the right information with the right parties. Information silos must be replaced by common information infrastructures that are available in all levels of a military operation’s command centre, whether that is in a static headquarters, a mobile operational-level command post, or the tactical mobile units. These infrastructures will ensure that the right information can be made available to both the commander as well as coalition partners. Once this is in place, the organisation’s core processes can evolve to translate information availability into military advantage.

These new ways of working will require new structures, policies and approaches to training staff at all levels. Cultural change is essential, for example, “need to know” attitudes of the past should be replaced by a “duty to share.” If this is not done, the advantages of improved information availability will be squandered.

Whilst the complexity and challenges of each step along the journey should not be underestimated, IBM’s technical excellence, combined with domain knowledge, is well suited to assist our clients navigate the journey.

**Relevance of service orientation**

Service-oriented architecture (SOA) is a technological approach to designing and building information systems. In SOA, applications are decomposed into separate “services” that are then made available to users, or “consumers.” Services can be consumed independently of each other or linked in different ways to support a variety of business processes. Services are independent of the computing platforms on which they run.

SOA is extremely flexible, providing the ability to plug services together, easily adding new services to meet evolving operational needs. SOA replaces the information “stovepipes” of the past with open architecture-based integration, enabling Information Superiority through sharing.

Data is passed between individual services via a standards-based messaging facility called the enterprise

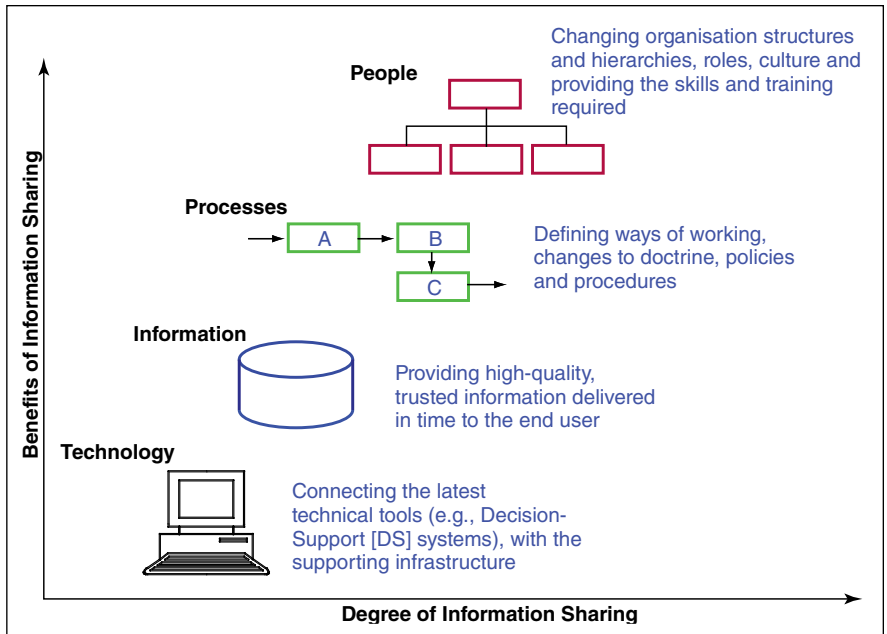


Figure 1: The netcentric transformation journey

service bus (ESB). The ESB makes it easier to implement large-scale integration because it reduces the complexity of application-to-application connectivity.







For example, deployed military personnel would act within a SOA model as “service consumers,”

requesting specific operational, intelligence, logistics data or information.

Depending upon the chosen enterprise service model being used, one or more “service producers” would provide that required information – making use of the transportation services of the ESB to deliver the service.

Depending on the request, the flexible nature of SOA architecture would give service producers the ability to access a variety of legacy applications with which to build their specific service. Flexibility leads to the provision of a diverse and changing portfolio of highly usable, information-rich services.

SOA appeals to Defence information consumers for the reasons listed in Table 2.

<i>Flexibility</i>	 <ul style="list-style-type: none"> <li>• Providing operational flexibility by increased granularity of processes enabled through services</li> </ul>
<i>Speed</i>	 <ul style="list-style-type: none"> <li>• Combining and reusing pre-built service components for rapid application development and deployment in response to legislative and program changes</li> </ul>
<i>Service</i>	 <ul style="list-style-type: none"> <li>• Improving customer service using services without having to worry about the underlying IT infrastructure</li> </ul>
<i>Risk</i>	 <ul style="list-style-type: none"> <li>• Improving visibility into Defence service delivery</li> </ul>
<i>Cost</i>	 <ul style="list-style-type: none"> <li>• Eliminating duplicate systems, build once and leverage</li> <li>• Reducing complexity and maintenance costs with common services</li> </ul>
<i>Efficiency</i>	 <ul style="list-style-type: none"> <li>• Integrating of historically separate systems and channels</li> <li>• Reducing cycle times and costs by moving from manual to automated transactions</li> </ul>

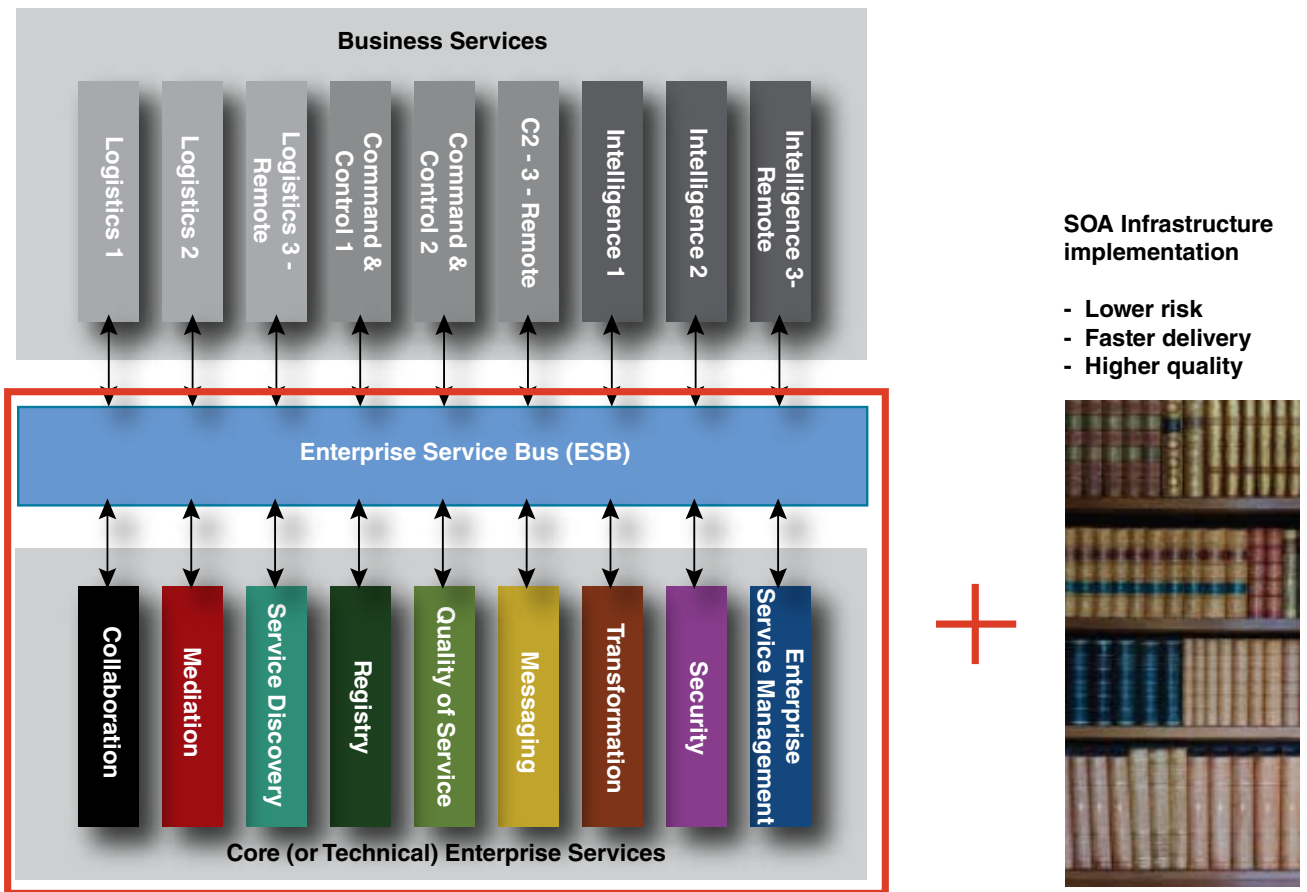


Figure 2: NCO SOA foundation - Concept

**NCO SOA foundation**

In recognition of the challenges facing a modern military, and the value that SOA can bring in addressing the technology and information management steps in the netcentric transformation, IBM has developed an innovative approach to the rapid provision of high-quality infrastructural services that forms the foundation of any SOA-based military solution. This concept is shown in Figure 2.

In analysing how to reap the most benefits from SOA, Defence organisations have identified a set

of nine core (or technical) services – shown below the ESB line in Figure 2 – that are always needed to underpin the business services to execute their intelligence, logistics or command and control requirements. A common set of core services will ensure that business services can be integrated seamlessly to provide the right combination of information to support a commander’s intent.

The IBM NCO SOA foundation renders these core services from best-of-breed commercial software products. These are integrated and supported by a comprehensive library of delivery assets – architectural blueprints, use cases, non-functional specifications, installation guides, and much more – harvested from a multitude of international projects and bringing the benefits of shared best practices. The goal is to reduce delivery risk whilst increasing quality and improving time to deployment.

**Why use NCO SOA foundation?**

There are a number of compelling reasons for a Defence organisation to use the NCO SOA foundation (NCO SOA-f), as listed in Table 3, below.

IBM’s passion for, and dedication to, open architectures ensure that NCO SOA-f promotes complete interoperability, whether this is between different forces in a coalition, or different vendor’s military systems. IBM has successfully demonstrated interoperability with ESB-based SOA solutions from other vendors at UK CWID 2007 and has implemented a federation of ESBs to meet the needs of the military user whether they are HQ-based, or part of a mobile, front-line unit.

Moreover, by providing rapid delivery of the core (or technical) services, NCO SOA-f lets the IBM team focus expertise and efforts onto our customer’s business needs, while enabling the military client supported by IBM to focus on the higher value transformational steps of process and people, as shown in Figure 1 above.

Business Services that sit on top of NCO SOA-f can be rendered in one of several ways: Legacy systems can be re-used by building the adapters and connectors to the ESB, thus allowing them to be discoverable as a service.







Alternatively, IBM’s extensive partner ecosystem can be a source of business services, ranging from Geographical Information Services (GIS) to Supply Chain Management (SCM) Services. Alternatively, IBM can develop bespoke services as needed to meet unique customer needs.

NCO SOA-f is comprehensively documented and supported by virtual and face-to-face education. This allows the local IBM team – and customer team – to rapidly compare what’s in the solution with their specific needs in the functional, non-functional, and documentation dimensions, thus enabling a controlled yet accelerated start to the project.

**Delivery excellence**

NCO SOA foundation is designed to underpin delivery excellence and will be used as part of IBM’s consultancy-led approach to helping our customers in their journey towards Network Centric Operations.

This would typically start with the application of Component Business Modelling (CBM) to build a comprehensive functional model of the customer’s existing business. Through analysis of this model and our customer’s current NCO and SOA readiness, the IBM team would recommend the transformational steps to netcentricity and the possible business benefits at each step.

<b>Table 3: Benefits of NCO SOA foundation</b>	
<i>Flexibility</i>	 • Built entirely of commercial off-the-shelf software and to industry/open standards
<i>Speed</i>	 • Includes pre-configured, ready-to-run “images” • Enables clients to get a fast start to realising the benefits of SOA
<i>Focus</i>	 • You can focus right away on the mission thread/business process (business vale).
<i>Complexity/ Risk</i>	 • Enables clients to implement complex functionality faster and with lower risk.
<i>Cost</i>	 • As proven in previous customer engagements, the implementation is done faster with less labour, less risk and lower overall cost.
<i>Inter-operability</i>	 • Includes a full commercial catalog of existing “connections and adapters,” providing interoperability with existing enterprise systems, as well as newer systems.

<b>Table 4: NCO SOA foundation functionality</b>		
<b>Function Area in SOA-f</b>	<b>Sub Area</b>	<b>Function Points/Use Cases</b>
<b>Service Governance</b>	Service Registry Management	Register Service
		Service Catalog Management
		Service Life-Cycle Management
		Service Version Control
		Identify Service
	Service Monitoring	Collect Service Metrics
		Publish Service Metrics
		Service Metrics Threshold Setting
Registry Synchronisation	UDDI Synchronisation	
Service Registry Management	Search for Service	
<b>Messaging Governance</b>	Topic Management	Create Topic
		Advanced Topic Management
		Subscribe to Topic
		Publish Message
		Search Topics
		Update Topic
		Delete Topic
	Messaging Infrastructure Monitoring	Message Queue Status
		Message Queue Statistics
		Broker Service Statistics
	Queue Management	Browse Queue
		Handle Exception Queue
		Handle Queue Depth Threshold
<b>Collaboration</b>	Instant Messaging Service	Universal Messaging Service
		One-on-one Chat
		Group Chat
		Presence Service
		Contact List Service
	Meeting Management	Meeting Scheduling
		Meeting Participating
		Screen Sharing
		Whiteboard
	Translation Service	Text Translation
		File Translation
		Chat Translation
	Team Room Service	Team Room
		File Sharing
<b>Information Assurance /Security</b>	Authentication	Unified Authentication Service
	PKI Management	Certificate Management
<b>Mediation</b>	Transformation Service	XML Transformation Service
		Adaptors Service
	Business Process Management	Business Process Management

Tool-based requirement capture and analysis would be used to build layers of detailed information beneath the functional model.

At this stage, the NCO SOA-f library shown in Figure 2 above would be used. The library contains a comprehensive definition of NCO SOA-f in functional, non-functional, and documentation terms to facilitate “gap analysis” to the project’s specific need.

The library also contains the delivery assets needed at all stages of the project, from specification through implementation, to post delivery support – giving the client the confidence to embark on the netcentric journey.

### **About IBM**

Successfully addressing the challenges facing Defence organisations requires more than just new technology; it requires a comprehensive approach based on a clear understanding of the issues our clients face, a deep understanding of their business, advanced business and technological thinking, and talented professionals who are passionate about what they do.

IBM is committed to supporting and assisting Defence organisations as they address the challenge of transforming from the industrial to the net-centric age, investing in IBM’s Global Defence Industry, a dedicated team of Defence industry consultants, subject matter experts and solution developers that is focused on helping our clients achieve Information Superiority.

Our Network Centric Operations solutions combine IBM’s deep insight into Defence organisations, with leading strategic consulting skills and unparalleled technical assets to help our clients forge a new path to more effective, more efficient, and more responsive operationally relevant capabilities.

Our success is accomplished by building strong relationships with our clients and their partners, by completing complex systems integration projects on time and within budget, by providing consulting services, introducing innovative solutions, backed by IBM’s extensive research and development capabilities, and underpinned by IBM’s broad portfolio of technology offerings.

For more information, please contact your IBM client representative, or visit:

**[ibm.com/government/](http://ibm.com/government/)**



© Copyright IBM Corporation 2008

IBM Corporation  
Route 100  
Somers, NY 10589  
U. S. A

Printed in the United States of America  
9 - 08  
All Rights Reserved

IBM, the IBM logo and [ibm.com](http://ibm.com) are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. If these and other IBM trademarked terms are marked on their first occurrence in this information with a trademark symbol (® or ™), these symbols indicate U.S. registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at [ibm.com/legal/copytrade.shtml](http://ibm.com/legal/copytrade.shtml)

Other company, product and service names may be trademarks or service marks of others.

References herein to IBM products and services do not imply that IBM intends to make them available in other countries. IBM makes no representations or warranties regarding third-party products or services.