Service Oriented Architectures (SOA) and Net-Centric Warfare: Similarities, Differences and Conflicts

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by

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• Introduction
• Objectives of SOA
• Advantages & Implementations of SOAs
• Objectives of Net-Centric Warfare
• Implementations of Net-Centric Warfare
• Common Features
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• Baseline Architecture Questions
• Conclusions
Introduction

SOAs provide agility by giving users:
• Open & interoperable system design
• A structure for problem & requirement resolution
• Common best practices & systems engineering techniques
• Consistency across the industry
• A vehicle for sharing strategies and proven approaches
Objectives of SOA

SOA’s principal objectives are to provide:
• Application reuse
• Fast response to business needs
Advantages & Implementations of SOA
Objectives of Net-Centric Warfare

Net-Centric Warfare’s Holy Grails:
• Timeliness
• Availability
• Throughput
Implementations of NCW

<table>
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<tr>
<th>IP</th>
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<tbody>
<tr>
<td>Asynchronous Transfer Mode (ATM)</td>
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<td>SONET/SDH</td>
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<td>Interface for OTN, G.709</td>
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<td>Optical Fiber/OTN (WDM)</td>
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Common Features

Both SOAs and Net-Centric Warfare require:

- Stable Requirements
- Correlation of Disparate Stakeholders
- Strong Management
## Fundamental Considerations

<table>
<thead>
<tr>
<th>IP Layer</th>
<th>OSI Layer</th>
<th>SONET Layer</th>
<th>ATM Layer</th>
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<th>Functionality</th>
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<tr>
<td>3/4</td>
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<td>AAL</td>
<td>CS</td>
<td>SAR</td>
<td>Providing standard interface, Segmentation and reassembly</td>
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<td>2/3</td>
<td>2</td>
<td>ATM</td>
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<td>Flow control, Cell header generation &amp; extraction, Virtual circuit path management</td>
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<td>3</td>
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<td>Phys</td>
<td>TC</td>
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<td>Cell multiplexing &amp; demultiplexing, Cell rate decoupling, Cell generation, header, Checksum, Frame generation, Packing and unpacking cells from enclosing envelope</td>
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Baseline Architecture Questions

• Should Architecture Be Software Based?
• Is an Enterprise Service Bus Appropriate?
• Should the SOA Be Implemented By a Single Vendor/Integrator?
Conclusions

- The SOA can either compliment or impede Net-Centric Principles
- Implementations should be pursued with adequate prototyping and testing
Abbreviations

• AAL – ATM Adaptation Layer
• ATM – Asynchronous Transfer Mode
• CS – Convergence Sublayer
• ICI – Interface Control Info
• IDU – Interface Data Unit
• IP – Internet Protocol
• NCW – Net-Centric Warfare
• OSI – Open System Interconnection
• OTN – Optical Transport Network
• PDU – Protocol Data Unit
• PMD – Physical Medium Dependent
• SAP – Service Access Point
• SAR – Segmentation and Reassembly
• SDH – Synchronous Digital Hierarchy
• SDU – Service Data Unit
• SOA – Service Oriented Architecture
• SONET – Synchronous Optical Network
• TC – Transmission Convergence
• WDM – Wave Division Multiplexing