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Acquiring COTS Software Selection Requirements (1998)

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Research Pre-empted a Trend

- World is now full of solutions with potential to meet our requirements
 - COTS, components, web services, business services, enterprise software, website templates, software architectures, even competitor examples of good practice
- All have potential to shape requirements for the better
 - Early method demonstrated one way how



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Some main benefits of COTS-Based Development!

- Reduction in development time - There is often a great demand to produce software as quickly as possible
- A reduction in lines of code to be written – COTS software provide functionality the developer would have to otherwise write, otherwise
- A reduction in complexity faced by developers - COTS software can provide abstractions that can hide complexity that a developer would otherwise have to tackle



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Background of COTS the Paper

- The work described The PORE Method –for COTS software products selection
- The PORE method was the first to 'specifically' address requirements engineering for COTS-based development
- PORE is informed by existing RE and knowledge engineering techniques, feature analysis, multicriteria decision making, argumentation, and template-based approaches
- The PORE method exploits the dependence between acquiring customer requirements and selecting COTS software to guide both acquisition and selection
- The paper reports on 11 problems encountered during the selection processes from the Royal Navy, major airlines, financial institutions and insurance syndicates projects



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Relevance in the real-world

- The results were used as the basis for two EU Funded Projects:
- BANKSEC Project - Secure Banking Application Assembly using a Component-Based Approach
- SeCSE – Service Centric Systems Engineering (secse.eng.it)



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BANKSEC Project (1)

- Funded by **the** European Union Framework V
- BANKSEC offered a complete solution for CBD in the banking sector - processes and methods for modelling dependability requirements and selecting trusted software components,
- BANKSEC delivered SCARLET, a process for requirements-driven component selection.
- SCARLET supports concurrent requirements acquisition and component selection
- Requirements act as selection criteria and candidate components inform further acquisition of requirements that enable developers to choose between components



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BANKSEC Project (2)

- SCARLET offers developers techniques to acquire requirements, discover components, test requirement-component compliance and guide decision-making.
- The SCARLET Process Advisor is workflow-based software tool that guides developers through the process and provides information about which techniques to use when
- SCARLET is a commercially-available product available in the form of consultancy services, training tutorials and the Process Advisor tool.
- Industrial evaluation and application –
 - Athens Technology Centre
 - Engineering Ingegneria Informatica
 - Banca Popolare di Sondrio



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SeCSE Project

- Funded by EU Framework VI
- To *“Create new methods, tools and techniques for systems integrators and service providers that support the cost-effective development and use of dependable services and service-centric applications”*
- Focused on Four activity areas
 - Service engineering: specification of services
 - Service discovery: discovering and retrieving services at development, deployment and run-time
 - Systems engineering: service-oriented architectures
 - Service delivery: deploying, monitoring and switching services
- Industrial evaluation and application
 - Fiat, DaimlerChrysler, Telecom Italia, Telefonica, Computer Associates, Microsoft, ATOS, Engineering



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Results Informed Other Research Work

- PhD Thesis – Cornelius Ncube
- Informed the work of other researchers including:
 - The CARE Process - Lawrence Chung
 - Negotiating Requirements for COTS-based Systems - Carina Alves/Anthony Finkelstein
 - Software Engineering for Information Systems Group at Universitat Politècnica de Catalunya (UPC) - Xavier Franch
- International Conference and Workshop Series
 - IEEE International Conference on Composition-Based Software Systems
 - International Workshop on COTS-Based Development



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Informed Other Lines of Research

- Informed other lines of research including
 - Service-oriented requirements
 - Opportunistic Software Systems Development
 - Composition-Based Systems Development
 - Open Source Software Development



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Use by Other Disciplines

Other disciplines that have used the research results include: (Scopus)

- Computer Science (93)
- Engineering (34)
- Mathematics (22)
- Biochemistry, Genetics and Molecular Biology (12)
- Business, Management and Accounting (9)
- Decision Sciences (9)
- Social Sciences (5)
- Economics, Econometrics and Finance (2)
- Health Professions (1)
- Medicine (1)



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Is the line of research still active

- COTS-Based development has become standard software development approach
- Social Informatics @ BU – Raian



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Research Challenges - COTS Software Increases Security Risks

- Most COTS-products are selected based on functionality rather than trustworthiness
- COTS-Based systems are optimized on cost of development and time to deployment— to the detriment of trustworthiness and often resulting in undetected vulnerabilities
- Trustworthy Systems - implication is that COTS-Based systems in pervasive use today will never become sufficiently trustworthy



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Research Challenges - COTS Software Increases Security Risks (Cont)

- Therefore relying on today's COTS-based systems to ensure security is risky, especially when such systems are meant to work over the Internet
- Therefore much work remains to be done in understanding the security implications of using COTS software!!