

TRUSTCOM

Scope

European companies operate in a global marketplace. Large enterprises mostly focus on ensuring intra-enterprise collaboration, while small companies need to collaborate with each other to provide sufficient value in each business proposition to compete successfully. For enterprises to collaborate, their IT systems need to interoperate, and they also need to manage the risks that arise from collaboration.

In the Trustcom vision, a manager with a certain business objective can use the Trustcom environment to identify possible collaboration partners and select the most appropriate for each role in a consortium. Then, she defines the collaborative business processes for the partners to achieve the collaborative business objective. She creates contracts to enforce time, cost, quality, and security constraints on this process. This will be enforced by the Trustcom environment, which supports the business collaboration throughout its lifecycle.

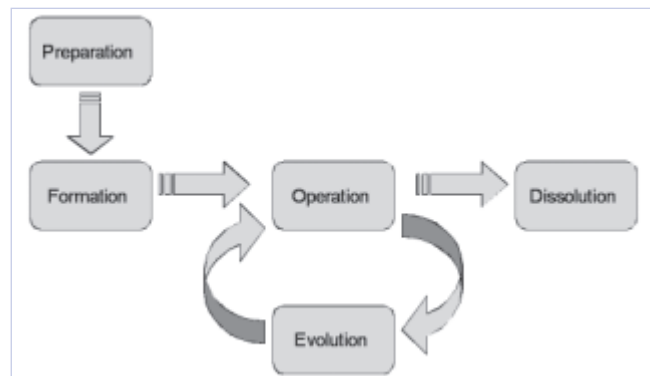
Trustcom has developed a framework for trust, security, and contract management for secure, collaborative business processing and resource sharing in dynamically-evolving virtual organisations. The framework incorporates the conceptual models required to understand the issues involved, an architecture to manage the risks that arise from business collaborations, and profiles of standards defining the subsets which interoperate, and proposing extensions where required. Legal analyses of the issues relating to contracts for virtual organisations, and the management of the business throughout its lifecycle have been incorporated into the framework along with social science and economic analysis of the trust judgments of the actors involved, and the best practice in supplier qualification analysis to select the collaborating partners. The service oriented architecture implemented as web services incorporating recent standards for security and trust has been produced in a reference implementation.

Advances

Trustcom has drawn on the expertise of lawyers, social scientists, business analysts and software experts to develop a framework to manage collaborative inter-enterprise business processes through contracts. These contracts state the usual details of objective, liability, confidentiality, costs, timescales and quality in natural language, but also in a machine-readable form which can control a software environment to enforce these policies and monitor performance. Thereby, the assurances are provided that are needed to manage the risks inherent in collaborative

relationships. The Trustcom environment transparently manages the collaborative business process freeing business managers to manage the business.

The Trustcom Framework addresses the entire lifecycle of a business collaboration from the first preparatory registration of potential partners in an Enterprise Network registry to the initial statement of the objective and business process to achieve it by the initiator of a virtual organisation (VO); through the formation of a consortium or value chain through the selection of partners and assignment to roles in that consortium; through the operation of the consortium as it enacts the business process and evolves in response to external changes in the business environment and changes within the consortium, to the final dissolution of the consortium once the business objective is achieved.



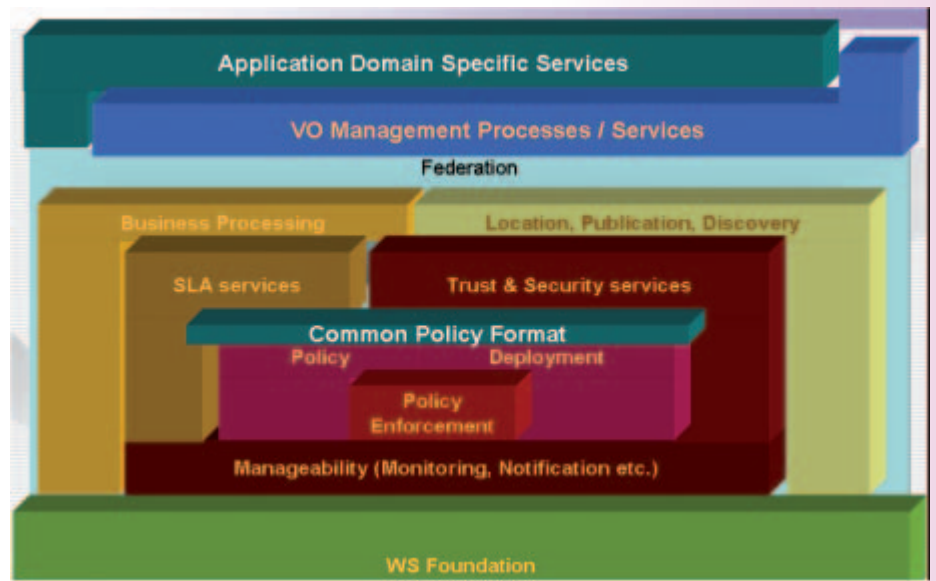
The VO lifecycle stages

The Framework includes an architecture which combines recently standardised technologies for Web Services security with research technologies for Service-Level Agreement (SLA) monitoring and event-condition-action policies. These policies can be triggered by events resulting from breaches in agreed levels for delivery schedule, partner reputation scores, security access policies or service quality levels. The use of secure Web Services allows organisations around the world to collaborate securely while providing the transparency within the virtual organisation for managers to assess the performance of the collaboration as the collaborative business process executes and to take the actions required to respond to changes in the business environment.

Positioning in global context

The Trustcom Framework defines concepts for trust, business and contract models. It is the first framework that integrates collaborative business processes, contracts, supplier qualification/ reputation, SLAs, and an infrastructure for monitoring, management and enforcement. The architecture caters for dynamic change from one phase in the VO lifecycle to another. Trustcom enables collaborative e-business by providing a balance between trust enhancing visibility and exposure/confidentiality of corporate information.

The Trustcom Reference Implementation contains all framework components. Several partners have developed components which interoperate. The Reference Implementation provides a basis for future software services and architecture development. Business contracts for a virtual organisation have been modelled, and VO member performance has been modelled and scored through business metrics. Legal issues have been integrated into policies in the General Virtual Organisation Agreement, and have been incorporated into Trustcom technical work.



Contribution to standardization and interoperability issues

While businesses need to balance between agreed functionality, competitive advantage, and need for interoperability, interoperability is a key requirement in today's multi-vendor market. Trustcom therefore has built upon existing well established and accepted standards and published specifications, where appropriate. Trustcom furthermore has contributed to the evolution of, and fed research results into, standards, where appropriate. For example, Trustcom has contributed to the development of several standards including WS-CDL, XACML-based coordination policies, the use of WS-Context in WS-Coordination, WS-Agreement and WSLA. Profiles have been published within the Trustcom framework showing how several existing standards should be used together to support complex applications. Profiles have been defined for WSLA, WS-Trust & SAML, WSCDL, and XACML. A range of detailed technical contributions have been passed into technical committees and working groups at standardisation bodies including OASIS, OGF and W3C.

Target users / sectors in business and society

The Trustcom approach to trust, security and contract management of collaborative business relationships is potentially beneficial to SMEs who need to form collaborative value chains, to large organisations which need to break down internal silos, to developers who need to provide the technology to these markets, and to legal and management experts who will advise on such developments.

The Trustcom framework includes conceptual models of the lifecycle of business collaborations as virtual organisations of various forms, and maps the language of business managers to that of technical developers. Both groups should benefit from an understanding of the concepts and design choices involved in using Web Services to support collaborative business processes.

The framework is supported by a series of reports which describe in detail the legal and economic issues behind the framework. These start and end by addressing the business and legal risks inherent in collaborative business processes while they cover in details issues of international law, confidentiality and IPR as well as the enforcement of service levels and supplementary legal issues, in order to show how these risks can be managed. This work should be of benefit to lawyers, managers and those in the IT development community who consider the legal aspects of business collaboration support.

The major result of the project is the reference implementation of the framework which will be of benefit to developers considering using Web Services to support business collaboration, either within or between enterprises where issues of security, quality of service and collaborative workflow arise.

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The use and evaluation of the technology in real business environments has allowed an evaluation of the business benefits of the approach not only in technical terms, but also in terms of usability by all stakeholders, the costs and benefits of the approach, and the broader business consequences of adopting IT mediated collaborative business processing. This benefits decision makers in industry.

Overall benefits for business and society

Trustcom supports organisations in dealing with trust, security, and contract management in virtual organisations. Thereby, Trustcom addresses a major concern for enterprises that wish to collaborate with other organisations. Thanks to Trustcom, enterprises are able to collaborate with each other while the risks that arise from collaboration are managed. This enables companies to operate and compete in a global marketplace.



Examples of use

In order to demonstrate the use of the conceptual and technological results, two demonstrators were produced and evaluated to show the benefits of the Trustcom approach, namely for collaborative engineering (CE) and for on-line learning or 'eLearning'.

The two scenarios are based on particular, and different, models of collaboration. For CE, the critical aspects are security and performance reliability. The eLearning scenario focuses on performance and the ability to manage more dynamic collaborations that meet individual end-user requirements. The individual requirements for the two scenarios were analysed across the VO lifecycle and consolidated into a general table of requirements. This also identified the critical functional areas that were relevant to the two scenarios. It was found that the two scenarios have many common requirements, other than some special requirements for reputation scoring and message security that were required for the eLearning scenario.

These major requirements were then compared against the functional requirements of the individual Trustcom Reference Implementation components and services. It was found that the majority of functional requirements were met except for two cases where they are only partially satisfied. The Trustcom Reference Implementation supports both scenarios in helping the Initiator of a VO to discover new partners, helps them to configure the relevant systems and then binds them together into a General VO Agreement that consolidates the technical and business requirements for collaboration. The Trustcom Reference Implementation also provides tools that can help a VO initiator to manage the collaboration in an automated way: partner performance can be monitored using the Trustcom SLA and reputation sub-systems and performance data can be compared against the agreement. If agreements are broken, then the Reference Implementation provides tools and facilities for containing, to a limited extent, their effects that can be used for individual application needs. In all, the Reference Implementation RI addresses the most critical basic requirements for building online collaborations or Virtual Organisations using web services for both scenarios.

Achievements

The Trustcom results are summarised below in terms of their availability:

| Project Result | Available as | Implementation license |
|----------------------------------|---|--|
| TrustCoM Framework V4.0 | Report | n/a |
| Legal Guidance | Reports | n/a |
| Business Guidance | Reports | n/a |
| Secure Token Service | Windows XP, Windows Server 2003 or Windows Vista; Microsoft Visual Studio 2005; Microsoft Web Services Enhancements (WSE) version 3.0 | Shared Source License for non-Commercial Use |
| Policy Decision Point | Java JDK 1.5; Ant; Axis 1.2/1.4; Tomcat 5/5.5. | Modified BSD license |
| Policy Enforcement Point | Java JDK 1.5; Ant; Tomcat 5/5.5; TrustCoM Gateway, STS & PDP. | Modified BSD license |
| Reputation Service | JRE1.4; Tomcat 4.x; WS Axis; MySQL | Modified BSD license |
| Secure Audit Web Service (SAWS) | JRE1.4; Tomcat 4.x; | Modified BSD license |
| General VO Agreement Manager | Java 1.5; MySQL | License for non-Commercial Use |
| Notification Subsystem | .Net 2.0; WSE 3.0; WSRE.NET 2.0 including Xindice DB or MSSQL DB); IIS | BSD license |
| Policy Server | Linux, MS-Windows or Mac OS X; Java 1.5; Apache Tomcat & Axis; TrustCoM Notification Subsystem. | BSD license |
| SLA Manager (HLRS) | .Net 2.0; WSE 3.0; SQL Server 2005; IIS 5++; Ganglia, TrustCoM notification subsystem; TrustCoM SIR | BSD license |
| Service Instance Registry (SIR) | Java JRE 1.5; Apache Ant 1.5 or higher; Apache Tomcat Server 5.5 or higher; Apache Axis 1.4 or higher; MySQL Database Server 5 | BSD license |
| UML2CDL | Apache Maven 2 or Ant LR 2.7.6 & JUnit 4.0 | GNU GPL license V2 |
| SLA Manager (SICS) | Java 1.5 SDK; Any 1.6.5; Tomcat 5.5; Xindice; GTK 4.0; TrustCoM Notification Subsystem; TrustCoM Application service monitors. | Modified BSD license |
| VO Management Toolkit | | n/a at this time |
| Gateway | | n/a at this time |
| CE demonstrator | Reports | n/a |
| e-Learning demonstrator | Reports | n/a |
| PP-Trust-X | | |
| CORAS Legal Risk Management Tool | Java 1.4.2 | GNU lesser GPL |



title

A trust and contract management framework enabling secure collaborative business processing in on-demand created, self-managed, scalable and highly dynamic Virtual Organisations

contract number

001945

type of project

Integrated Project

contact point

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project website and partner list

<http://www.eu-trustcom.com/>

EC contribution

6 299 999 €

start date

01/02/2004

duration

40