

★ Automated access rights establishment is paramount to dynamic entities' federations and service integration, essential in eBusiness environments and emergency service response. **Antonio Maña Gomez** and **Hristo Koshutanski**, of iAccess, explain how their project contributes in this area

Highly Dynamic Coalitions drive forward eBusiness

The possibility of rapidly finding a set of partners that best fit a business opportunity and then quickly configuring them into a collaborative network to exploit that opportunity, is a desirable scenario when facing the challenges of market turbulence in modern Europe. The idea is also very appealing in non-business oriented contexts such as continuous service provisioning, incident management and disaster response processes, when it is necessary to rapidly engage and coordinate activities of a large number of entities (e. g., fire brigades, police, hospitals, local government, non-governmental organisations). This very idea of groups of organisations being able to rapidly configure themselves into some form of mission/goal-oriented collaborative form embeds the notion of great agility.

Dynamic coalition consists of independent organisations that share resources and skills to achieve significant mission objectives. These types of coalitions allow small and medium enterprises to be more innovative and competitive in the market, adapting to new opportunities in a dynamic business environment.

Dynamic coalitions are formed in response to a specific request (market demand, business request, or disaster response, to name a few). Partners forming a coalition are automatically selected, given some business criteria and become active participants from the time the coalition is formed. The project targets a specific type of dynamic coalitions, called Highly Dynamic Coalitions (HDCs). HDCs form a subclass of dynamic coalitions where the coalition formation and operation are strictly bound by time in order to

provide a prompt reaction to some events. The main characteristic is their short life, which introduces the need for on-the-fly coalition formation and restructuring, by means of computer and communication systems, and under strong timing constraints. This type of dynamism poses the necessity of underlying access control models and technologies allowing for automated coalition formation and operation.

control interoperation among entities sharing a same coalition formation.

We started from semantics of access control between agents and realised the importance to generalise the model to multi-partner coalitions. Semantics of access control over dynamic coalition highlighted to us its potential to emergency response domain and, more generally, to HDC formations. The project contribution is twofold:

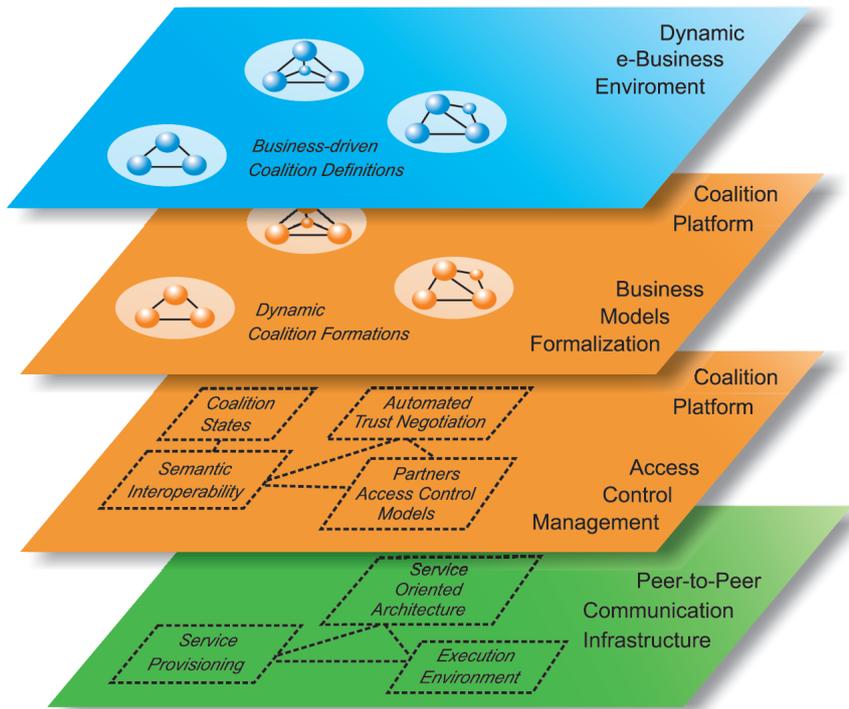
Coalitions allow small and medium enterprises to be more innovative and competitive in the market, adapting to new opportunities in a dynamic business environment

Accessing autonomic networks

The iAccess fellowship targets autonomic networks with main feature on demand federation of entities, and on demand integration of services in response to a request or goal. An autonomic network is composed of entities with heterogeneous systems and with no unified security requirements. The research of the iAccess project aims at leveraging access control establishment and enforcement in autonomic communications – where each entity is responsible for the management and enforcement of its own security settings. Two research directions are addressed – bilateral, and multilateral access rights management. The former led to the release of an iAccess prototype for bilateral automated access rights negotiation between autonomic entities. The latter direction targeted access

- Identifying the inherent lifecycle of HDC along with the corresponding security challenges to each phase of the life cycle.
- Developing a platform-driven access control model based on semantics of partners' access control settings to provide interoperable access control process to resources shared in a coalition.

The platform-driven approach allows for achieving automated coalition formations, whilst providing coherent access control process to coalition services during operation. The access control model allows coalition partners to achieve a high level of service interoperation using class relations based on standard ontology. It defines interoperability of partners' access control requirements,



Stack view of how dynamic coalitions integrate into an eBusiness model

allowing efficient access control management to coalition services.

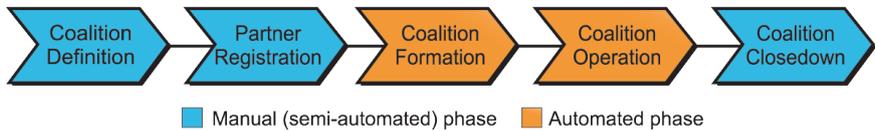
Coalition clients use coalition resources with minimal burden in satisfying partners' requirements as the platform can take an informed and automated decision on whether to provide service access based on semantic interoperability. Trust negotiation functionality between a coalition client and a coalition platform is defined, allowing for automated credential establishment of necessary access rights with a current coalition instance (configuration).

An interesting aspect as a result of the access control interoperation is the provision of state-based semantic interoperability. A coalition may have explicit states that characterise a particular functionality. An example could be normal state coalition operation versus critical or emergency state, or open business operations versus VIP-based operations. Such state cases provide the root information of how the access control semantic interoperation (reconfiguration) would automatically adjust to accurately

handle seamless access control process according to a new state.

Entities recognised with certain digital rights are provided different degrees of access to services depending on the pre-defined interoperability for a given state. This coalition access control reconfiguration is done without the necessity of restructuring partners' access control settings, and during the coalition operation.

For example, the following relation of equivalent Class (Fire brigade Officer, State police Officer; emergency) would activate an equivalent relation of a semantic context of a 'Fire brigade Officer' with that of a 'State police Officer' in case an emergency state is triggered. The underlying access control mechanism will automatically provide respective access to coalition services of entities holding a digital certificate of Fire brigade Office as they were authorised as being State police Officer, and vice versa. In a normal state, functioning such extreme equivalent access to resources would not be provided. ★



Graph of a dynamic coalition lifecycle

At a glance

Full Project Title
Interactive Access Control with Trust Management for Pervasive Autonomic Networks – iAccess

Contact details
Prof. Antonio Maña – Scientist in Charge
E.T.S.I. Informatica (Desp. 3.2.16)
Universidad de Málaga
Campus de Teatinos, 29071 Málaga (SPAIN)
W: www.lcc.uma.es/~amg
E: amg@lcc.uma.es
T: +349 5213 7142

Dr. Hristo Koshutanski –
Marie Curie post-doc fellow
E.T.S.I. Informatica (Lab. 3.3.4)
Universidad de Málaga
Campus de Teatinos, 29071 Málaga (SPAIN)
E: hristo@lcc.uma.es
W: http://www.koshutanski.net

Antonio Maña Gomez (Left)
Hristo Koshutanski (Right)



Scientist in Charge

Antonio Maña received his Ph.D. degree in Computer Engineering from the University of Málaga in 2003. Currently he is Professor at the Department of Computer Science of the University of Málaga. He is currently scientific director of the FP6 SERENITY project and UMA's principal investigator of FP7 OKKAM project.

Marie Curie post-doc fellow

Hristo Koshutanski received a M.Sc. in Mathematics from Plovdiv University "Paisii Hilendarski" in 2001 and a Ph.D. in Information and Communication Technology from the University of Trento in 2005. Dr. Koshutanski holds EU Marie Curie EIF Fellowship with a host institution the University of Málaga for the period April 2007 – March 2009.



www.interactiveaccess.org