



Plataforma Tecnológica Española de Convergencia hacia Internet del Futuro

FORMULARIO PROPUESTA NUEVO GRUPO DE
TRABAJO DE LA PLATAFORMA ESPAÑOLA DE
**CONVERGENCIA HACIA INTERNET DEL
FUTURO**

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Nombre del nuevo grupo de trabajo:
Internet Scale Systems of Systems
Acrónimo (nombre de referencia) :
ISSoS

Entidad proponente:
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Descripción del grupo de trabajo:
<p>This workgroup is closely related to the cross-pillar programme Internet Scale Systems of Systems as defined by the vision document engineered by this platform.</p> <p>Consequently, this workgroup aims to ensure that the Internet of the Future solves the problems posed by the characteristics of Internet Scale Systems of Systems, i.e. collaborative autonomies with lack of central authority, unknown boundaries in a changing environment and emerging behaviours.</p> <p>It must be stressed, though, that outcomes arising from this research effort should be usable in large scale networks favouring the evolution towards convergence among networks, applications and the Internet. Internet is the model because of its scale and complexity but the aim of this research addresses any other large scale networked systems (e.g. telecom operator's networks, companies internal ERP's,...).</p> <p>This research effort has the following characteristics:</p> <ul style="list-style-type: none">- It is a transversal approach to the Internet of the Future perspective. This is, realizing ISSoS involves innovation in every pillar of the Internet of the Future: content, users, devices, services and

- networks.
- It goes beyond current Internet approaches and consequently catalyses the growth of this Internet towards future network and application convergence.
 - It addresses the whole logical cycle required to solve the demands for the SoS paradigm by means of Internet:
 - realization (*How can semantics tackle diversity in ISSoS? Do device interfaces have the adequate interfaces? Are existing SOA and network interfaces agile enough to efficiently support changing and emerging peers? Is it possible to assemble new composite services by combining functionalities from diverse systems? Are new development phases required? Does ISSoS need new architectural elements? How should the content be encapsulated to flow within ISSoS? And authentication and authorization? Do they make sense in the traditional way regarding ISSoS? Should new standards, protocols, languages, techniques, methodologies,... be developed? Some functions that must be included are those related to system monitorization, composition and autodiscovery*),
 - deployment (*New business processes will have to be designed and enacted, achieving adequate and controlled degrees of coupling among them. These business processes will have to be monitored and will adaptively evolve and anticipate emerging behaviours in the environment. It will be necessary to abstract the user from the complexity of ISSoS*)
 - and governance (*ISSoS must address interoperability and collaboration at several levels: data, processes, individuals, organizations and nations. Governance should consider how to achieve manageability of ad-hoc created ISSoS. The orchestration vs. choreography debate should be solved for ISSoS leading to innovative patterns. Some of the difficulties that must be overcome include managing multivendor and multitechnology environments where every element may require a different type of control. ISSoS must be 'queriable', that is, it must be possible to know their internal composition at any given time by an interested and authorized entity*)

- Posibles aplicaciones:**
- Some application scenarios have been identified (this is a non-exhaustive list though):
- Health systems, including systems from social security, hospitals, pharmacies, ambulances, etc. that must work together to provide a service to a person the suffered an accident.
 - Air transportation systems, including reservation, ticket issuing, travel planning, luggage management, airport services, etc. to ensure that an efficient transportation service is offered.
 - Car navigation systems, including traffic information services, route planning, GPS, entertainment systems, motorway services, etc. to provide effective breakdown service on road.
 - Enterprise systems, including resource planning, purchasing systems, customer management systems, etc. that need to accomplish a business process.

- OSS/BSS (Operation and Business Support Systems): A telecommunications network is managed by OSS and BSS that guide the network devices so as they provide the required services by means of coordinated work.
- ...
- Ubiquitous computing scenarios where a user can interact with any service at anytime everywhere without previous knowledge of the services and systems available in her current context.
- ...

Estado actual del sector de aplicación:

In general, the area of Systems of Systems has traditionally been developed from a monolithic perspective in fields such as mechanics, manufacturing or avionics.

However, existing technologies do not cater for the particular circumstances affecting systems interacting through Internet: universality, openness, dynamism, loose governance and largeness. In consequence, the dimension of the problems of SoS turns into a very different scale and so it is expected for the new solutions.

On the other hand, many scenarios which could potentially benefit from ISSoS techniques have been born as a consequence of centralized unified management (often carried out by means of manual labour) This fact has originated systems which are unable to evolve at required speeds. Every new subsystem brings new capabilities into this ISSoS as a whole. Those capabilities must be leveraged by integrating each subsystem into the network as seamlessly and quickly as possible, avoiding manual procedures to decrease costs.

Otros comentarios:

Refer to the cross-pillar programme in the vision document of this platform.