

Trends and approaches for Future Internet Architectures based on Service Orientation techniques

Over the past three decades, the Internet has evolved from a point to point, open, academic network to an applications and services oriented critical infrastructure. The Internet has become a vital component of society today, from its humble origins as an academic research project. This network of networks still uses the original one dimensional static layered model as the underlying communication architecture. During the dramatic growth of the Internet, numerous applications and usages of the network emerged that cannot be efficiently implemented by adhering to its original design tenets. Some of these principles have been broken, others diluted and new ones are emerging to accommodate new paradigms and communication models.

Simultaneously, applications and services have been moving slowly but consistently towards a uniform model based on Service Oriented Approach (SOA). The shift towards abstract models, objects and services however is not supported by the underlying delivery platforms, especially the legacy Internet architecture. An architectural rethinking is necessary at the network level, to accommodate future services, applications and routing priorities. We argue that there is a pressing need to move towards a next generation network architecture built to natively support parallel processing of communication tasks, high level network resource abstraction, enhanced routing, privacy, Quality of Experience (QoE), heterogeneous networking etc. This new architecture should be manifested according to the principles of SOA to ensure interoperability, backwards compatibility and migration. We extend this approach by following SOA to make components more reusable and scalable. This thesis proposes a new communication architecture allowing integration of characteristics from several dimensions, in particular security, mobility and context-sensitivity. This new architecture integrates these dimensions in ways not feasible within the layered approach. The results of this work have been published in various conference proceedings and journals.

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