SOA, Cloud Computing & Semantic Web Technology: Understanding How They Can Work Together

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Overview

• SOA + Cloud Computing
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Overview

**SOA 101**

Service-oriented architecture is a technology architectural model for service-oriented solutions, with distinct characteristics in support of realizing service-orientation and the strategic goals associated with service-oriented computing.

**Cloud Computing 101**

Cloud computing is a specialized form of distributed computing that introduces utilization models for remotely provisioning scalable and measured IT resources.

**Semantic Web Technology 101**

Semantic Web Technology represents a technology platform used to describe artifacts, their properties, and their relationships using machine-processable language.
SOA + Cloud Computing
Using Cloud Computing with SOA

- Cloud computing platforms can help reduce the investment required for SOA ecosystems and service-oriented solutions by making necessary infrastructure and IT resources available for lease at proportional costs.

- Cloud computing platforms can improve the agility and responsiveness of service-oriented solutions by providing infrastructure with enhanced and dynamic scalability, often beyond the reach of an on-premise IT enterprise.

- Cloud computing platforms can improve the reliability of service-oriented solutions by providing infrastructure with improved failover and redundancy, also beyond the ability of the typical IT enterprise.
Applying SOA to Cloud Computing

- SOA and the application of service-orientation can directly enhance the design quality and performance of cloud-based solutions, especially those with shared services.

- SOA and the application of service-orientation can standardize and formalize the architecture and usage of shared, cloud-based services, thereby increasing their long-term value, while reducing their governance burden (especially in relation to the reuse of shared services across solutions).

- The successful utilization of cloud computing technology in support of SOA can help reduce waste and redundancy, size and operational cost, as well as the general cost and overhead associated with solution governance and evolution.
SOA + Semantic Web Technology
Semantic Web technology can be used to create semantic metadata that can be applied at different levels within an SOA ecosystem.

For example, it can provide:

- machine-processable meaning of data exchanged by services
- machine-processable meaning of service capabilities
- machine-processable meaning of services
- machine-processable meaning of service compositions
- machine-processable meaning of state data shared or deferred by services
- machine-processable meaning of IT resources used or shared by services
Applying SOA to Semantic Web Technology + Metadata

Service-orientation principles, SOA patterns, and SOA governance controls can be applied to semantic Web technology and metadata. For example, they can enable you to:

• architecturally position semantic Web technologies and standardize their usage
• standardize and decouple semantic metadata exchanged by services
• standardize and decouple semantic metadata published about services
• standardize and decouple semantic metadata published about service capabilities
• standardize and decouple semantic metadata published about service compositions
• abstract semantic metadata architecture from service architecture
• normalize and centralize logic required to process semantic metadata
Furthermore, semantic metadata shaped by SOA modeling, design, and governance frameworks and processes can enhance various areas of automated solution architecture and usage. For example, they can result in:

- **increased message intelligence** that can provide enhanced routing and runtime message processing features
- **increased service contract intelligence** (for example, greater incorporation of SLA content) that can lead to extents of automated service and service capability discovery
- **increased intelligence in semantic processing logic** that can lead to automated service composition (or augmentation of service compositions)
Cloud Computing + Semantic Web Technology
The application of semantic Web technology and metadata can be applied at different levels within and across cloud platforms and environments.

For example, it can provide:

- machine-processable meaning of cloud-based IT resources
- machine-processable meaning of cloud services
- machine-processable meaning of clouds
- machine-processable meaning of “terms & guarantees of service” for clouds, cloud services, and other cloud-based IT resources
Using cloud computing platforms and technologies in conjunction with semantic Web technology and metadata can help popularize the usage of semantic metadata, while improving the semantics of the cloud computing landscape itself.

For example, it can help:

- broaden accessibility of repositories, cloud services, and other IT resources with semantic metadata
- increase utilization potential of repositories, cloud services, and other IT resources with semantic metadata
- commercialize the usage of semantic metadata and semantic IT resources
- improve automated evaluation, navigation, and consumption of clouds and cloud-based IT resources
Depending on how they are applied and what combinations are created, we can establish a wide variety of semantically-enabled environments, depending on our requirements, capabilities, and goals, and further depending on the maturity of the supporting technology and the cooperation of affected stakeholders.

For example:

- semantic services and service-oriented solutions
- semantic clouds
- semantic cloud-based services and service-oriented solutions
- standardized semantic metadata
- cloud-accessible semantic metadata
- standardized, cloud-based semantic processing logic
Combining SOA models and practices with cloud computing technology and resources, as well as semantic Web technology innovation leads to a realm of potential for enhancing the interoperability, performance, and adaptability of modern-day automated solutions.

Some sample scenarios:

• Individual moving parts of a service-oriented solution can be dynamically discovered, augmented, evolved, and scaled in response to business change.

• Proliferation and commercialization of standardized semantic metadata can be supported within and across communities.

• Improved potential for the normalization and centralization of meaningful data within and across enterprises and communities.
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