Challenge
Organizations lack automated tools to model and maintain business processes from both an IT perspective and an enterprise view, making it difficult to ensure compliance and understand variances between business requirements and supporting service oriented architecture (SOA) software systems.

Focus
This CA Labs research project is focused on linking the expected behavior of business processes with the actual behavior of SOA systems.

Result
By modeling the relationships among business processes, IT systems and enterprise views, organizations can better understand how to build and maintain a SOA and can establish the variance between planned IT support and actual business requirements.

Business processes and the IT systems that support them develop and evolve at different rates. Keeping IT technologies aligned to changing business processes is a never-ending IT requirement. When alignment goes askew, the risk of business errors or slowdowns increases and the technology limitations of a SOA are viewed as the culprit.

The quantity, quality and complexity of tasks defined in IT business process definitions require business friendly tools for modeling. These business tools seldom link to IT tools for requirements management, implementation or runtime monitoring. Manually linking business process modeling and IT management tools expensive and time-consuming. Automated tools and methods that can detect and evaluate SOA alignment deviations and help identify and validate business process compliance would help keep the business running more smoothly and exposed to fewer risks from errors or slowdowns.

The CA Labs ABPA research project is targeted at the development of techniques to model intended system behavior (business processes) and actual behavior (runtime properties) of supporting SOA software systems through a prototype tool. The research also will develop techniques for the tool that will compare these models in order to validate system behavior against actual behavior. The comparison data will provide definition input to a compliance policy at the business process level and may highlight compliance failures when behavior models do not align as they should.

Figure 1  ABPA research is identifying links between the perceived business processes (what the business thinks is happening) and the actual IT behaviors (what is going on at run-time)
SOA layers and ABPA models

SOA systems, in this context, can be described as these three layers of abstraction with ABPA models for each layer:

- In the lowest SOA layer are source code models, architectural models and environment and platform-related models. These models are usually specified per service, per component or per server node.
- The middle layer deals with workflow models that are related to the runtime, process-centric, and behavioral views of the SOA system as a whole. At this layer are behavioral models such as activity diagrams and service level agreements.
- The highest layer of abstraction relates to business process models and other high-level enterprise-wide organizational models. This layer includes business processes and organizational constraints; pre/post conditions and invariants; and formal or semiformal models that describe the compliance and governance requirements of the systems at the business process level.

The models at each level of abstraction conform to a set of constraints, properties and invariants. The ABPA research is developing a framework that can be used to verify and validate instances of models at one level of abstraction and ensure that they do not violate the properties, constraints and invariants of models at the other levels.

The ABPA techniques project static and dynamic models and model features from one level of abstraction to the models and model features of the other levels of abstraction. Features of static models are being extracted by static analyzers, while features of dynamic models are extracted by logging and monitoring tools in order to detect and evaluate SOA alignment deviations and help identify and validate business process compliance.

More information on CA Labs ABPA research project

CA Labs is collaborating with researchers from the National Technical University of Athens in Greece and the University of Trento in Italy. The following papers were published about this research project:


For additional information about this or other CA Labs projects, please contact Peter Matthews at Peter.Matthews@ca.com.

About CA Labs and innovation

CA Labs is the research arm for CA Technologies and a hub for the company’s initiatives for innovation. CA Labs collaborates with the world’s foremost researchers in academia, industry and government to perform advanced research to address cloud, software-as-a-service, security, virtualization, automation, mainframe, service assurance, and service and portfolio management challenges. For more information, visit ca.com/calabs.