Overview of Caffeine – ABAP to Go

Applies to:
SAP Technology

Summary
An overview into Caffeine is provided through this article. Caffeine is a toolset that allows execution of the ABAP language on alternative runtimes outside of the ABAP server. As of today it supports the execution of a subset of ABAP on the JVM (Java), Dalvik VM (Android), iOS (Objective C), and JavaScript. Its core design is centered around high performance, multi platform execution and multi threading.

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Created on: 29 September 2010

Author Bio
Daniel is a software engineer by education and has been with SAP since 2006. He has led the Caffeine project that enables the execution of ABAP code on many platforms. Before, he has been the architect and lead developer of the Blue Ruby project where he was responsible for the virtual machine definition and implementation.
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Caffeine

Caffeine in a Nutshell

Caffeine is a toolset that allows execution of the ABAP language on alternative runtimes outside of the ABAP server. As of today it supports the execution of a subset of ABAP on the JVM (Java), Dalvik VM (Android), iOS (Objective C), and JavaScript. Its core design is centered around high performance, multi platform execution and multi threading.

Caffeine is at the moment a prototype project and proves the claims made. There is currently no relation to any current or future SAP product, but we are working on achieving this.

What is it for?

Caffeine is a technology, not an application, and it can thus be applied to many use cases. Caffeine is not trying to enable the migration of existing ABAP code to other platforms, but is focusing on adding value to SAP’s On-Device, On-Demand, On-Premise strategy by making SAP’s business programming language reach into spaces like mobile devices that our customer are looking to unlock and feed with information coming from the customers backend. Caffeine strives to help developers to build business applications that are better integrated from frontend to backend.

Some of these use cases we see today are:

- **Extending the Reach of SAP Data** (by enabling ABAP developers to contribute libraries to client applications for consumption of an SAP backend.)

  Being able to provide information from SAP systems requires a skill set that is traditionally carried by ABAP developers focusing on business processes and business data. Developers that build mobile applications are generally not equipped with this knowledge and most often do not have access to resources that allow them to acquire this knowledge in an appropriate time. However, to be able to successfully build applications that reach into the mobile space both knowledge has to be available. Caffeine extends the ABAP world into client technologies, enabling the ABAP developer to provide value by extending the reach of the business know-how directly into the client.

- **Client Side ABAP Logic**

  Extending the reach of information into other areas by using the language and know-how of traditional backend developers can remove the burden of having to write business logic themselves. Validation logic for data is one of the examples where Caffeine reduces complexity and rate of errors for a frontend developer by enabling the business developer to provide it to him.

  This additionally can also remove load from a backend by avoiding unnecessary roundtrips enhancing the responsiveness and usability of the application without the necessity to increase TCO. Caffeine can also reduce TCD by allowing to take-over existing ABAP validation logic to a limited extend.

- **Processing Data where it Resides**

  Caffeine as a toolset to run ABAP on the JVM can also be leveraged to run the ABAP language on a non-ABAP server. One could image using it as an extension for the above described client libraries by providing the ABAP language inside a container that sits closer to data that needs to be manipulated. In large volume data transformation and manipulation this can mean significant performance improvement by executing code where data lives removing the necessity to move data to code before it can be processed.
Key Features

Caffeine executes a subset of the ABAP language on other platforms. This subset, however, is semantically 100% identical and is therefore real ABAP. For instance, an integer addition still checks for overflows and a division, unlike Java, rounds the result. Apart from that, Caffeine adds keywords to the language to simplify use on the target platform.

The key features of the Caffeine Runtime are:

- **Designed for Multi Platform**
  
  Caffeine is designed to with the flexibility in mind that in can go on any execution environment. Especially in the client side use case the question of the support for different platforms becomes important. Caffeine executes ABAP primarily on the Java VM, but can leverage XMLVM cross compilation technology to execute the same code on Objective C, JavaScript and Dalvik, Androids' runtime.

- **Language Integration**
  
  Caffeine is designed as a true business data processing DSL. We believe that there is no one size fits all language and therefore provide the possibility to integrate with languages that close this gap for us. We have no intention to let the client developer build his UIs in ABAP, nor do we want them to develop frameworks that can achieve this. Instead we want UIs to be able to call ABAP just like frameworks of other languages and integrate them with each other.

  We don't believe that opening a platform to "any" language is a good thing per se (for reasons of supportability and scalability of development), but a small number greater than 1 is needed and thus multi language support is an important issue.

- **Backend Integration**
  
  Caffeine uses the type system of ABAP tables and structures mapping various backend type systems to it. This allows the developer to seamlessly mix and match different type systems of backend with simple ABAP calls.

- **Column Based Types**
  
  Caffeine has his own implementation of structured internal tables to support high performance mass data processing. This implementation internally uses a column-based approach to store raw data and eliminate the need of native runtime objects for it. By using this approach we reach execution performance that significantly outperforms even the Netweaver ABAP kernel.

- **Simple Multithreading**
  
  Leveraging the concept of componentizing ABAP code into mostly stateless services, we were able to implement a multithreading model that shields the developer from all the complexities that come with concurrency. Caffeine is able to parallelize the execution of a program with pure sequential non-concurrent semantic. This means one does not need to be a multi threading expert to leverage multiple cores on the machine.

If you want to know more take a look at:

The demo video shown at SAPPHIRENOW demonstrates how a (very) simple ABAP program runs on all of the supported platforms:

Caffeine Demo SAPPHIRE

This demo video shows what client side ABAP validation looks like and how it gets executed on Android.

Video link: Caffeine: ABAP for Android

Or simply contact Daniel.Vocke@sap.com.
Overview of Caffeine

ABAP to Go

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