

**INDUSTRY**  
Retail

**COMPANY**  
@WalmartLabs

**LOCATION**  
Sunnyvale, CA

**TECHNOLOGY PARTNER**  
Tomitribe

**OPEN SOURCE SOFTWARE**  
Apache TomEE

# @WalmartLabs

## PLATFORM & ADOPTION OF APACHE TOME

WalmartLabs enables over 245 million customers to visit Walmart's 11,000 stores, in 28 countries, and 10 websites worldwide.

#ONEOPS

“**CHOOSING TOME IS ABOUT CHOOSING A SUSTAINABLE FUTURE, THIS INCLUDES MICRO SERVICE ARCHITECTURES AND THE FUTURE OF THE EMBEDDED CONTAINER.”**

**RYAN MCGUINNESS**  
PRINCIPAL ARCHITECT  
WALMART ECOMMERCE

### KEY CHALLENGES

- Adopting bleeding edge technologies without conflicting standards.
- Overcoming the bias and anti-marketing campaign that Java EE is outdated.
- Getting teams to clean-up their project dependencies.

### CHALLENGE

As a global platform for all of Walmart, we face the challenge of creating a sustainable enterprise. With a broad choice of technologies, shadow IT, global deployment, internal and external clouds, worldwide development and Walmart scale, the platform team must deliver a second to none, diverse solution.

### APPROACH

Partnering with Apache TomEE and Tomitribe enables WalmartLabs to build a standards-based application server that encompasses internal platform technologies that span the gamut of cloud services.

### INTEGRATION

WalmartLabs uses OneOps, an internal multi-cloud management suite<sup>1</sup>. This has allowed for integration of TomEE as a deployment target and customize TomEE to meet Walmart's unique scaling concerns, enterprise wide.

### SOLUTION

Tomcat is the most used application server, however it negates the use of Java EE technologies, which is why WalmartLabs chose TomEE as the application server. Many other servers were evaluated, but due to the social interest and investment in Tomcat core and ease of configuration, TomEE was the clear choice. In the past, developers have turned to 3rd party solutions for creating enterprise applications to avoid the bloated application servers. In turn sacrificing deployment size for flexibility, thus fragmenting the enterprise. By partnering with Tomitribe and using TomEE, WalmartLabs has created a set of light-weight, hybrid containers which merge industry best practices and provides a sustainable platform for enterprise development. Using TomEE as our base container gives developers the comfort of Tomcat with the power of CDI and Java EE standards. It dramatically reduces dependency management issues and the overall artifact size, in most cases by over 60%.

### BUILDING PLATFORM SERVER

At WalmartLabs, the build process uses Gradle and Maven, which allows for creation of custom "Profiles" for WalmartLabs' application servers. These profiles extend the basic TomEE profiles by adding additional Open Source Software (OSS) and platform specific software to the class path.

As seen in the following figure, @WalmartLabs Platform on Apache TomEE, the basic profiles were extended by adding constructs like JDBC drivers;

<sup>1</sup> Jeremy King, "WalmartLabs is releasing OneOps cloud technology to the world as open source." [The @WalmartLabs Blog](http://www.walmartlabs.com/2015/10/14/walmartlabs-oneops-open-source/), 14 Oct. 2015 <<http://www.walmartlabs.com/2015/10/14/walmartlabs-oneops-open-source/>>.

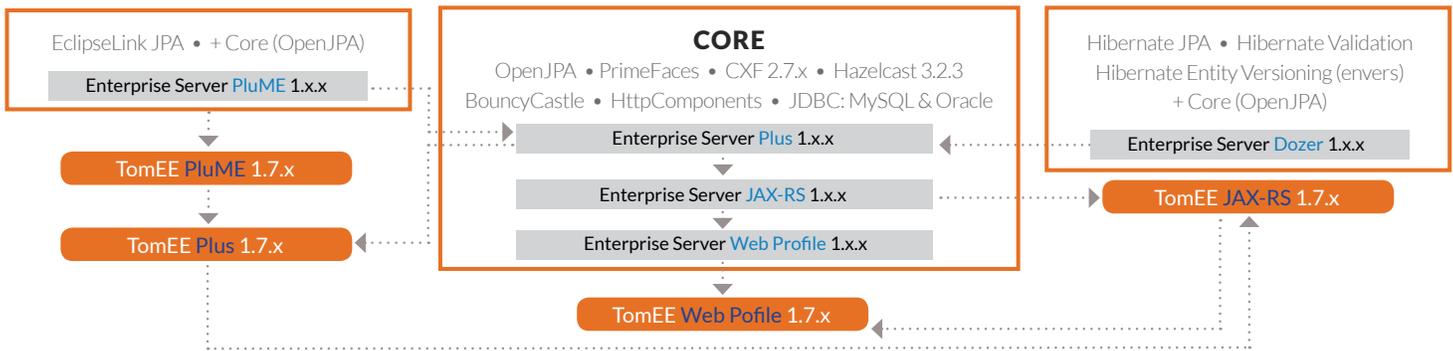


Figure 1. McGinness, Ryan. (2015). @WalmartLabs Platform on Apache TomEE.

Cryptography Providers, Grid Computing via Hazelcast, updated CXF, replaced JavaServer Faces implementation with PrimeFaces etc. Then a custom profile was created to allow Hibernate as a JPA provider.

In addition to the OSS libraries, platform specific client libraries were added to the class path, enabling WalmartLabs to extend the containers functionality. This includes logical extension like metrics, configuration, messaging, data providers, etc. The flexibility of the TomEE container allows WalmartLabs to create purpose built, business meaningful applications servers. Paired with OneOps (cloud management solution), it also enables WalmartLabs to update software and service provider frameworks without complex orchestration among the many teams of Walmart

## CHALLENGES

The most challenging hurdles with development teams were to help them understand the complementary nature of Java EE and CDI to other upcoming technologies, and to overcome the bias nature of the past.

Another challenge is the quickly changing nature of some of the core libraries within TomEE such as CXF. There are logical extension points, but to maintain compatibility with the Java EE 6 container causes some contention.

## OVERCOMING CHALLENGES

The most meaningful way in which WalmartLabs has overcome adoption issues has been by providing working applications and model applications along with training. As a set of service providers, WalmartLabs has also adopted TomEE in ~100 deployed instances in the last six months.

## OUTCOME

Walmart continues to roll out the TomEE packages and gain momentum as more teams adopt and achieve faster times to market. The positive impacts CDI continues to bring to the table, paired with Java EE extensions, provide a solid and sustainable core platform. This saves time, which saves money, which helps everyone live better.

## FUTURE

Choosing TomEE is about choosing a sustainable future. This includes micro service architectures, the future of the embedded container, influencing the industry through standards and fueling the innovative nature of Open Source through community partnership.

## BENEFITS OF ADOPTION

- Faster time to market.
- Cost savings by reducing enterprise storage footprint across CD / CI environments.
- Faster deployment times due to decreased artifact dependencies.
- Higher quality of assets through integration testing via Arquillian.
- Standardized & simplified development practices.
- Limited impact to current developer skill sets.
- Logical extension points for internal frameworks.