

# Using Quercus<sup>®</sup> to Run the WordPress PHP blog on Google App Engine

**Nam Nguyen**  
Software Engineer  
Caucho Technology  
<[nam@caucho.com](mailto:nam@caucho.com)>

**Emil Ong**  
Chief Evangelist  
Caucho Technology  
<[emil@caucho.com](mailto:emil@caucho.com)>

## Introduction

When Google introduced the ability to run Java on the Google App Engine, it also opened the door to a number of scripting languages implemented in Java, including PHP. Quercus, Caucho Technology's 100% Java implementation of PHP, is a fast scripting engine that runs both existing PHP applications as well custom code that combines Java and PHP together. Using these features, Caucho Engineer Nam Nguyen modified the popular WordPress PHP blogging software to use Google App Engine's Datastore as a backend, removing the need for an SQL-based database such as MySQL. The result is a real PHP application running on the Google App Engine via Java and Quercus.

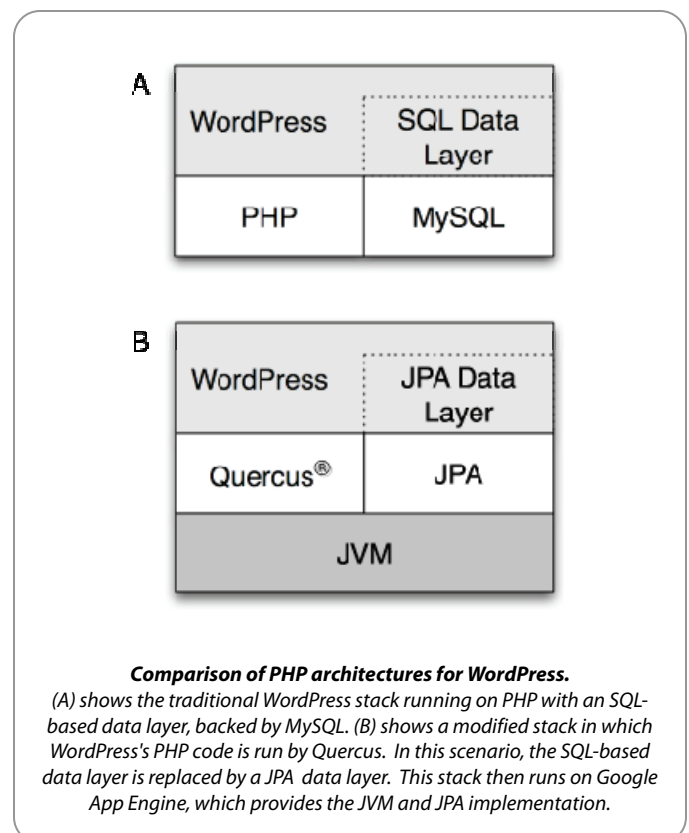
WordPress persists data in an object-relational model (ORM), which fits well with JPA. In its pure PHP form, the application uses SQL statements directly to read and write fields of objects representing blog posts, users, comments, etc. Nguyen replaced this data layer by first creating JPA entities that represent each of the WordPress objects. Then he replaced the SQL code in the WordPress data layer with JPA code that retrieves and stores persisted objects. This approach is possible because Quercus enables Java-PHP integration so that PHP code can call Java methods and manipulate Java objects.

## Architecture

WordPress is an open source PHP application that uses MySQL as its database, like many PHP applications. Unfortunately the Google App Engine does not provide MySQL or any other SQL database, but it does provide the ability to store data via Java Persistence API (JPA). Thus to enable WordPress to run on Google App Engine, there are two requirements:

1. A PHP Engine
2. A way for WordPress to use JPA as a database

Quercus provides the engine that allows the WordPress PHP code to run on the Java version of the Google App Engine. To fulfill the second requirement, Caucho Engineer Nam Nguyen made some simple modifications to retarget the WordPress data layer to use JPA.



## Example Code

The code in this section shows an example of how Java entities can be used in PHP as objects with a JPA model replacing the SQL data layer. Specifically WordPress uses a table for comments that has the following schema:

```
CREATE TABLE wp_comments (
  comment_ID bigint(20) unsigned
    NOT NULL auto_increment,
  comment_post_ID int(11)
    NOT NULL default '0',
  ...
  user_id bigint(20)
    NOT NULL default '0',
  ...
  PRIMARY KEY (comment_ID)
)
```

In the modified version of WordPress running on GAE, this table has been replaced by the Comment Java entity:

```
package com.caucho.gae.wordpress271;

import javax.persistence.*;

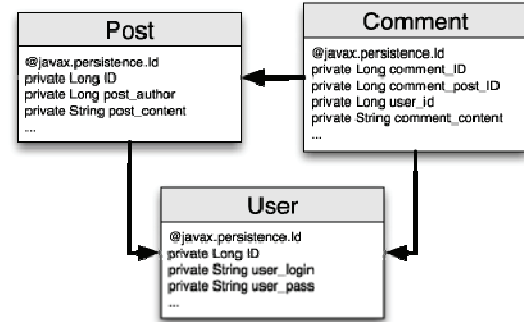
@Entity
public class Comment
{
  @Id
  @GeneratedValue(strategy=
    GenerationType.IDENTITY)
  private Long _commentID;
  private Long _commentPostID;
  ...
}
```

SQL queries that previously retrieved rows from the database have been replaced using the JPA Query Language (JPAQL) in a straightforward way:

```
function get_comments($id)
{
  $query = $this->pm->createQuery("
    SELECT FROM " . GAE_COMMENT_CLASS .
    ' WHERE _commentPostID = :id AND
    _commentApproved = "1" ORDER BY
    _commentDate');
  $query->setParameter("id", $id);

  $results = $query->getResultList();
  ...
}
```

JOINS are simulated in PHP as JPA does not have direct support for these types of queries, but overall the resulting code is simpler than the original PHP because the ORM layer has been pushed down to use JPA.



**An example JPA entity relation for WordPress.**  
JPA entities represent tables from WordPress's SQL data layer. This figure shows one set of relationships between blog posts, post comments, and users.

## Conclusion

This example of modifying WordPress shows the flexibility of Quercus and potential of the Google App Engine. While WordPress is particularly well-suited to this conversion because it follows ORM principles, many other PHP applications can now potentially be ported to run on the App Engine. A more general solution may also be possible if an SQL database can be added to or simulated in the App Engine environment. Quercus enables the App Engine to run PHP code and provides the bridge that allows PHP applications to connect to Java databases.

## About Caucho Technology

Caucho Technology is an engineering company devoted to reliable open source and high performance Java-PHP solutions. Caucho is a Sun Microsystems licensee whose products include Resin application server, Hessian web services and Quercus Java-PHP solutions. Caucho Technology was founded in 1998 and is based in La Jolla, California. For more information on Caucho Technology, please visit <http://www.caucho.com/>

**The modified WordPress source code**  
<http://wordpress-on-quercus.appspot.com/wordpress-on-gae-quercus.zip>

**WordPress on Quercus/GAE live demo**  
<http://wordpress-on-quercus.appspot.com>

**Quercus Home Page**  
<http://quercus.caucho.com/>

**Caucho Engineering Blog**  
<http://blog.caucho.com/>

## LINKS