



Programming for the Web and Other Networks

# WELCOME TO DISTRIBUTED JAVA

Instructor: Jim Lombardo



# INTRODUCTIONS

- ✖ Jim Lombardo, Instructor
- ✖ Distributed Java, Course #152-198
- ✖ Pre-requisites:
  - + Registered (gets you on my roster)
  - + Completion of Intro Java #152-134 & Advanced Java #152-135 with grade of “C” or better, or academic/commercial equivalents
- ✖ Student Introductions: your name, career goal and what you’ve been working on (code)

# ABOUT THIS COURSE

- ✖ What do we mean by the phrase “Distributed Java”
  - + A computer software program, often polyglot, split into modules or tiers, where each module/tier runs on a different computer
  - + The web is a distributed execution environment: client tier + server tier (>= 2 computers needed)
  - + But regular, non-web apps can also be distributed among multiple computers on a LAN: grid computing, remote method invocation (RMI), etc.

# ABOUT THIS COURSE

## Why Java?

- + Many developers use PHP, C#.Net, VB.Net, Ruby on Rails and other languages to develop web apps
  - + All are good choices, depending on the job. Pick the right tool for the job.
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- + Java Advantages:
    - ✖ Portability across Operating Systems
    - ✖ Powerful JVM (performance and scalability)
    - ✖ Huge number of features., E.g., Java has built-in messaging via JMS and remoting via EJBs. Many others do not.
    - ✖ Large Ecosystem of third-party libraries
    - ✖ Solves problems others cannot

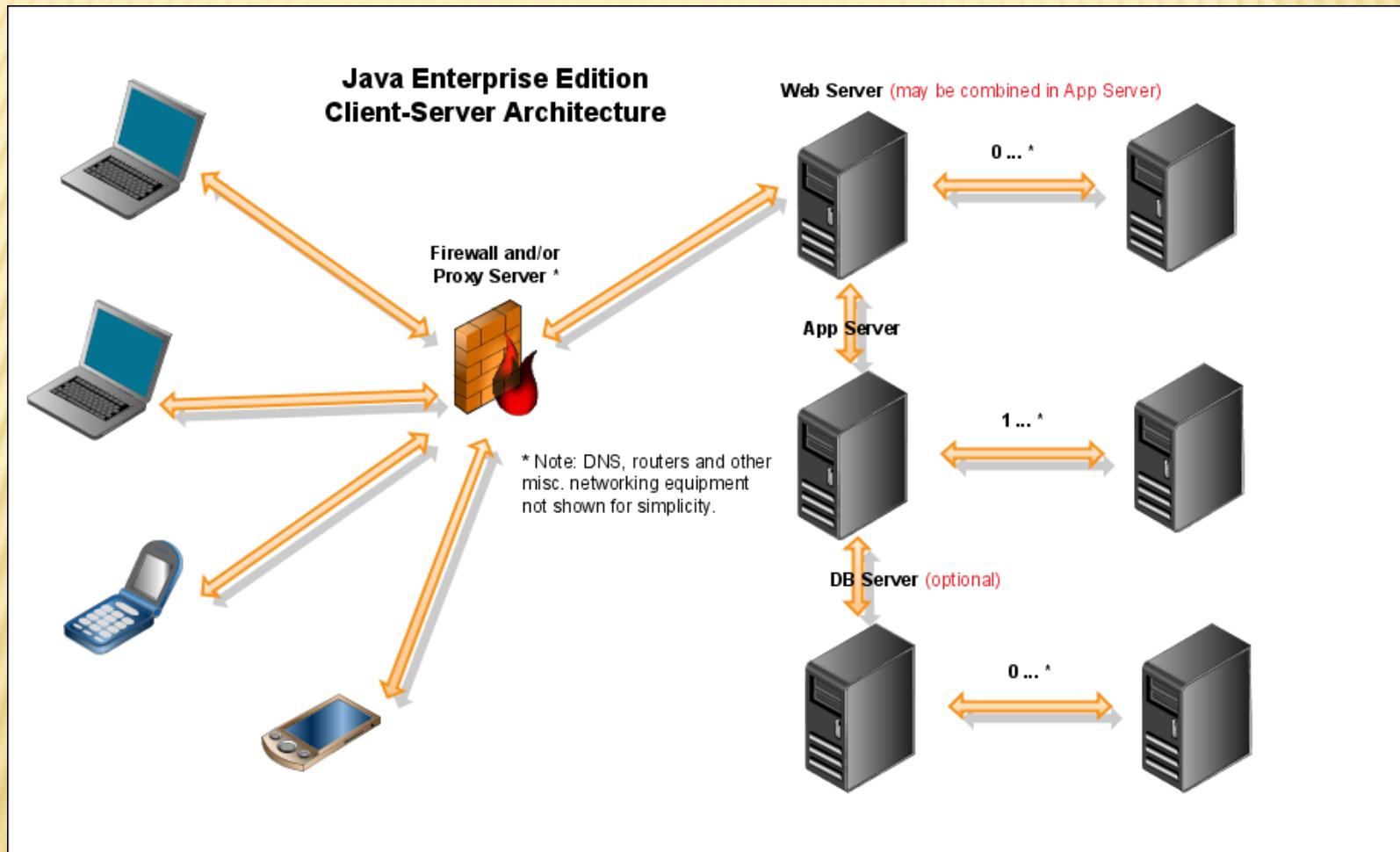
# ABOUT THIS COURSE

- ✖ Who Uses Java for Web Development?
  - + Large and Small companies
  - + Large Organizations such as: Johnson Controls, GE, Wells Fargo, US Bank, Twitter, Kohls, NM Ins.
  - + Small Organizations such as: Guardian Business Solutions, Boar's Head Deli Products ...
  - + World-wide #1 language in world:  
<http://www.tiobe.com/tiobe-index/>  
<http://pypl.github.io/PYPL.html>

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# DISTRIBUTED WEB APP EXAMPLE (N-TIER)



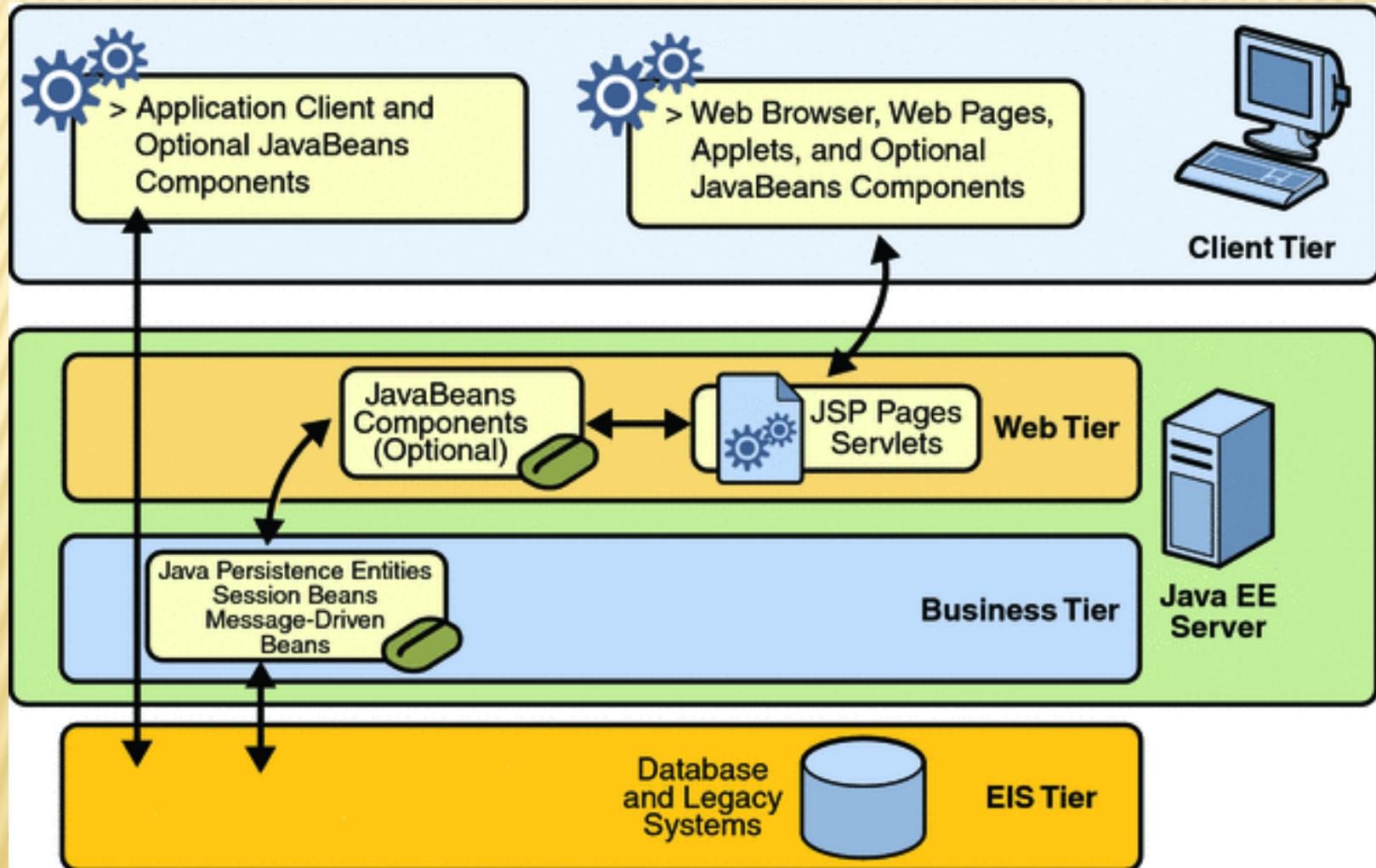
# RACK MOUNTED SERVERS



# ABOUT THIS COURSE

- ✖ Why Should We Bother to Create Distributed Applications that Use Multiple Computers?
  - + Service more users, run faster, process more data
  - + More computers means more processing power
  - + Decoupling of modules/tiers: more flexible
  - + Reuse common functionality among different programs
  - + Horizontally scalable (easily adapt to increased processing demands)

# JAVA EE WEB APP SERVICE TIERS



# ABOUT THIS COURSE

- ✖ Why Should We Bother to Create Web Applications?
  - + That's where the work/jobs are
  - + Economies of scale:
    - ✖ Faster time to market
    - ✖ Centralized server install vs. many users machines
    - ✖ No printing or distribution costs
    - ✖ Users get 24x7 availability, anywhere in world, with only Internet access & Web Browser software required
  - + It's a distributed environment!

# THE SKILLS YOU WILL NEED

- ✖ What Do You Need to Know to Create Distributed Apps?
  - + **Design Patterns** for Flexibility, Quality
  - + Some **Networking** Tech
  - + How **Servers**, Especially Web Servers, work
  - + How **Clients**, especially Web clients, work
  - + At least 4 **languages**: Java\*, HTML, CSS, JavaScript
  - + **Frameworks** for the Web and Other types of Distributed Application Development
- + \*Or VB, C#, PHP, etc.

# ARCHITECTURE IMPACTS WEB APP QUALITY

- ✖ As you learned in Advanced Java, **architecture** plays a big role in the overall quality of your application
- ✖ Same **metrics** apply: **a quality app has:** non-rigid, non-fragile and highly portable (flexible) modules
- ✖ Even **more important with a distributed app**. Why? Because modules now live on multiple computers. Deciding **where and how many computers** requires careful consideration

# EXAMPLE OF A POOR ARCHITECTURE

- ✖ You don't want your app to work like this:



# ABOUT THIS COURSE

- ✖ You will need to learn **two** Java frameworks to build web apps in Java
- ✖ What's a Framework?
  - + Software libraries that make development easier
  - + Standard, built-in to JEE, plus 3<sup>rd</sup> Party
    - ✖ 100s in Java World: more choice, more freedom, more challenge
    - ✖ Only 2 in Microsoft World (ASP & ASP.Net): vendor lock-in, only the Microsoft way, licensing costs
    - ✖ PHP also very limited
  - + How to Choose:
    - ✖ Avoid dogma, choose best tool for job
    - ✖ Learn legacy and modern techniques
    - ✖ 3<sup>rd</sup> Party Perspective

# ABOUT THIS COURSE

- ✖ You will need to learn **two** Java frameworks to build web apps in Java:
  - + Legacy (JSPs and Servlets with HTML5, CSS and JavaScript)  
**(F-A-S-T, total control, but labor-intensive)**
  - + Ultra-Modern (RESTful Web Services with HTML5, CSS and JavaScript)  
**(decouples server-side technology from client-side)**
  - + Many others (50+): JSF, ZK, Vaadin, Struts, etc.

# ABOUT THIS COURSE

- ✖ For each technique you will build a web app that serves as a major assessment (2 tests in all) of competency; plus random quizzes
- ✖ Lots of ungraded lab work to give you experience, plus code sample reviews
- ✖ All labs MUST be eventually completed successfully to pass the course
- ✖ Those who do the work, do the learning

# RECENT UPDATES

- ✖ Java Web Application developers use the **Java Enterprise Edition (JEE)** on top of the Java Standard Edition (JSE).
- ✖ Unlike JSE you don't download a JDK for JEE. Instead, the **software libraries are embedded** in the JEE Server – in our case that will be Glassfish.
- ✖ **JEE v7 was released** (Summer 2013). Many new features; some challenges. We'll focus on v7.

# DEMONSTRATIONS

- ✖ Build a web application, using the MVC design pattern, to recommend beer brands based on a person's preferred color (amber, pale, etc.)
  - + Simple JSP/Servlet demo
- ✖ Samples of Real World Web Apps
  - + Boar's Head
  - + Bit Club Auction App

# COURSE SYLLABUS

- ✖ How are points earned or lost in this course (be specific)?
- ✖ What is the attendance policy and why is it so strict?
- ✖ What is the policy regarding late assignments and missed tests?
- ✖ How should work be submitted?

# NEXT ACTIVITY

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- ✖ Go to the Class Plan on Blackboard and continue there

# EMPLOYERS WANT

- ✖ Technical skills, yes, but ...
- ✖ Passion for programming is even more important. Why?
- ✖ Having personal project(s) as a hobby is a good way to demonstrate passion
- ✖ A common interview questions is “tell me about your personal projects”

# COURSE SYLLABUS INVESTIGATION

- ✖ Describe in your own words the Student Code of Conduct and why it's important
- ✖ Describe in your own words the meaning of Academic Integrity and why it matters
- ✖ What is the policy regarding Computer Labs (our classroom)?
- ✖ What is policy regarding Special Needs?

# COURSE SYLLABUS INVESTIGATION

- ✖ Describe the policy regarding recording devices and cell phones
- ✖ How would you know if bad weather will lead to a cancelled class?
- ✖ What tools, equipment and books are required for this class?
- ✖ When does your instructor have office hours?

# A LITTLE ACTIVE LEARNING EXAMPLE

- ✖ Go to “Course Syllabus” in Blackboard and open the document
- ✖ First person to correctly and completely answer the following questions will receive +1 point added to today’s participation score for each question