

# What's so Groovy about Groovy

A Beginners Guide to Groovy

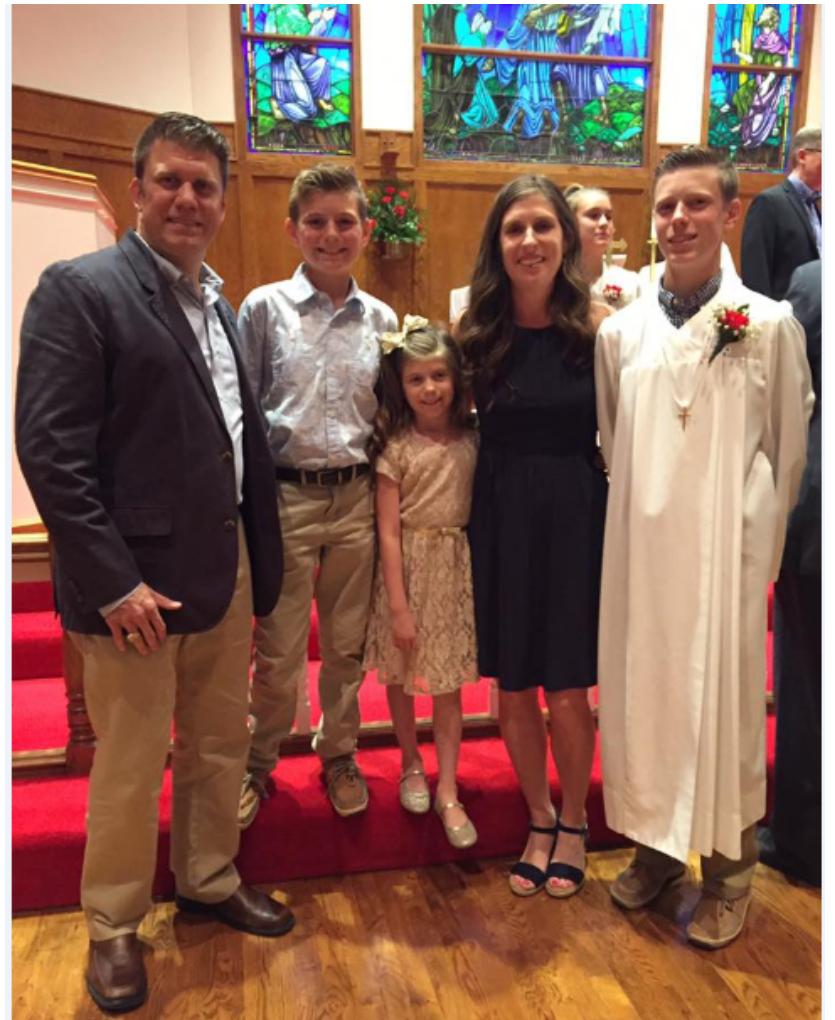
Erik Weibust

# Agenda

- Why Groovy
- Let me see it!
- Where can I learn more
- How do I use it...
- What didn't we cover... Lots, but we got you smart enough to take the next step!

First... Who am I?

# Erik Weibust... Husband, Father, Aggie, etc...



# Erik Weibust... Technologist, IT Manager



**Countrywide  
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# Erik Weibust... Technologist, IT Manager



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# Why Groovy

# Powerful, optionally typed, dynamic language



## Flat learning curve

Concise, readable and expressive syntax, easy to learn for Java developers



## Smooth Java integration

Seamlessly and transparently integrates and interoperates with Java and any third-party libraries



## Vibrant and rich ecosystem

Web development, reactive applications, concurrency / asynchronous / parallelism library, test frameworks, build tools, code analysis, GUI building



## Powerful features

Closures, builders, runtime & compile-time meta-programming, functional programming, type inference, and static compilation



## Domain-Specific Languages

Flexible & malleable syntax, advanced integration & customization mechanisms, to integrate readable business rules in your applications



## Scripting and testing glue

Great for writing concise and maintainable tests, and for all your build and automation tasks

# Lots of big names... You won't be a trailblazer

## They all use Apache Groovy!

NETFLIX amadeus



CARFAX  
VEHICLE HISTORY REPORTS

carriots<sup>®</sup>

cisco

Mutual of Omaha

CREDIT SUISSE

AIRBUS  
GROUP

ENERGY TRANSFER



Europäisches  
Patentamt  
European  
Patent Office  
Office européen  
des brevets

FannieMae

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JPMorganChase

LinkedIn



MUSIC TELEVISION®

COMMERZBANK

NATIONAL  
CANCER  
INSTITUTE

Nestlé

ORACLE

Paterson  
Institute for Cancer Research

Roche

sas sky

SONY



THALES

UBS

vodafone

Voyages-  
snCF.com

Walmart

WELLS  
FARGO

# And now it's Apache maintained

The Groovy programming language is supported by the [Apache Software Foundation](#) and the Groovy community



© 2003-2017 the Apache Groovy project — Groovy is Open Source, [Apache 2 License](#)

# Apache 2 ??? Read this and then ask a lawyer

Can	Cannot	Must
▼ Commercial Use 	▼ Hold Liable 	▼ Include Copyright 
Describes the ability to use the software for commercial purposes.	Describes the warranty and if the software/license owner can be charged for damages.	Describes whether the original copyright must be retained.
▼ Modify 	▼ Use Trademark 	▼ Include License 
Describes the ability to modify the software and create derivatives.	Describes the allowance of using contributors' names, trademarks or logos.	Including the full text of license in modified software.
▼ Distribute 		▼ State Changes 
Describes the ability to distribute original or modified (derivative) works.		Stating significant changes made to software.
► Sublicense 		▼ Include Notice 
▼ Private Use 		If the library has a "NOTICE" file with attribution notes, you must include that NOTICE when you distribute. You may append to this NOTICE file.
Describes the ability to use/modify software freely without distributing it.		
▼ Use Patent Claims 		
Describes the rights to practice patent claims of contributors to the code.		
► Place Warranty 		

Let me see it!

Hello World(s)

# HelloWorld with Java

```
1 public class HelloWorld {  
2  
3     public static void main( String[] args ) {  
4         System.out.println( "Hello, world!" );  
5     }  
6 }  
"HelloWorld.java" 6L, 117C written
```

# HelloWorld with Groovy

```
1 println "Hello, world!"  
~  
~  
"HelloWorld.groovy" [New] 1L, 24C written
```

# HelloWorld Output... That 1 line groovy worked 😊

```
Tue May 16 22:54 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ java HelloWorld
Hello, world!
```

```
Tue May 16 22:54 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ groovy HelloWorld.groovy
Hello, world!
```

# Assert

# Assert with Java

```
1 public class JavaAssertDemo {  
2  
3     public static void main( String[] args ) {  
4         assert 2+2==5;  
5     }  
6 }
```

```
Thu May 11 18:34 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk  
$ java -ea JavaAssertDemo  
Exception in thread "main" java.lang.AssertionError  
at JavaAssertDemo.main(JavaAssertDemo.java:4)
```

# Assert aka “power assert” w/ Groovy

```
1 class GroovyAssertDemo {  
2  
3     static void main( String[] args ) {  
4         assert 2+2==5;  
5     }  
6 }
```

```
Thu May 11 18:35 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk  
$ groovy GroovyAssertDemo.groovy  
Caught: Assertion failed:  
  
assert 2+2==5  
| |  
4 false  
  
Assertion failed:  
  
assert 2+2==5  
| |  
4 false  
  
at GroovyAssertDemo.main(GroovyAssertDemo.groovy:4)
```

# Java Asserts Have a Bit More (had to be fair) ...

```
1 public class JavaAssertDemo2 {  
2  
3     public static void main( String[] args ) {  
4         assert 2+2==5: "2 + 2 is *not* 5";  
5     }  
6 }
```

```
Sat Jun 10 09:18 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk  
$ java -ea JavaAssertDemo2  
Exception in thread "main" java.lang.AssertionError: 2 + 2 is *not* 5  
    at JavaAssertDemo2.main(JavaAssertDemo2.java:4)
```

... but they are completely inferior to power asserts

Java Bean / Groovy Bean

# Java Bean

```
1 import java.util.Date;
2
3 public class Person {
4
5     private String name;
6     private Date dob;
7
8     public Person() {
9
10
11     public Person( String name ) {
12         this.name = name;
13         this.dob = new Date();
14     }
15
16     public Person( String name, Date date ) {
17         this.name = name;
18         this.dob = date;
19     }
20 }
```

```
21
22     public String getName() {
23         return name;
24     }
25
26     public void setName( String name ) {
27         this.name = name;
28     }
29
30     public Date getDob() {
31         return dob;
32     }
33
34     public void setDob( Date dob ) {
35         this.dob = dob;
36     }
37
38     public String toString() {
39         return "Person(name:" + name + ", dob:" + dob + ")";
40     }
41 }
```

# Java Bean (cont.)

```
1 public class PersonDemo {  
2  
3     public static void main( String[] args ) {  
4         Person p = new Person();  
5         System.out.println( p );  
6         Person p2 = new Person( "Erik" );  
7         System.out.println( p2 );  
8     }  
9 }
```

```
o Thu May 11 22:44 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk  
$ java PersonDemo  
s Person(name:null, dob:null)  
Person(name:Erik, dob:Tue May 16 22:44:52 CDT 2017)
```

# Groovy Bean

```
1 @groovy.transform.ToString( includeNames=true )
2 class GroovyPerson {
3
4     String name
5     Date dob
6 }
```

```
1 public class GroovyPersonDemo {
2
3     public static void main( String[] args ) {
4         GroovyPerson p = new GroovyPerson();
5         System.out.println( p );
6         GroovyPerson p2 = new GroovyPerson( name:"Erik", dob:new Date() );
7         System.out.println( p2 );
8     }
9 }
```

~

```
Mon May 15 19:14 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ groovy GroovyPersonDemo.groovy
GroovyPerson(name:null, dob:null)
GroovyPerson(name:Erik, dob:Mon May 15 19:14:19 CDT 2017)
```

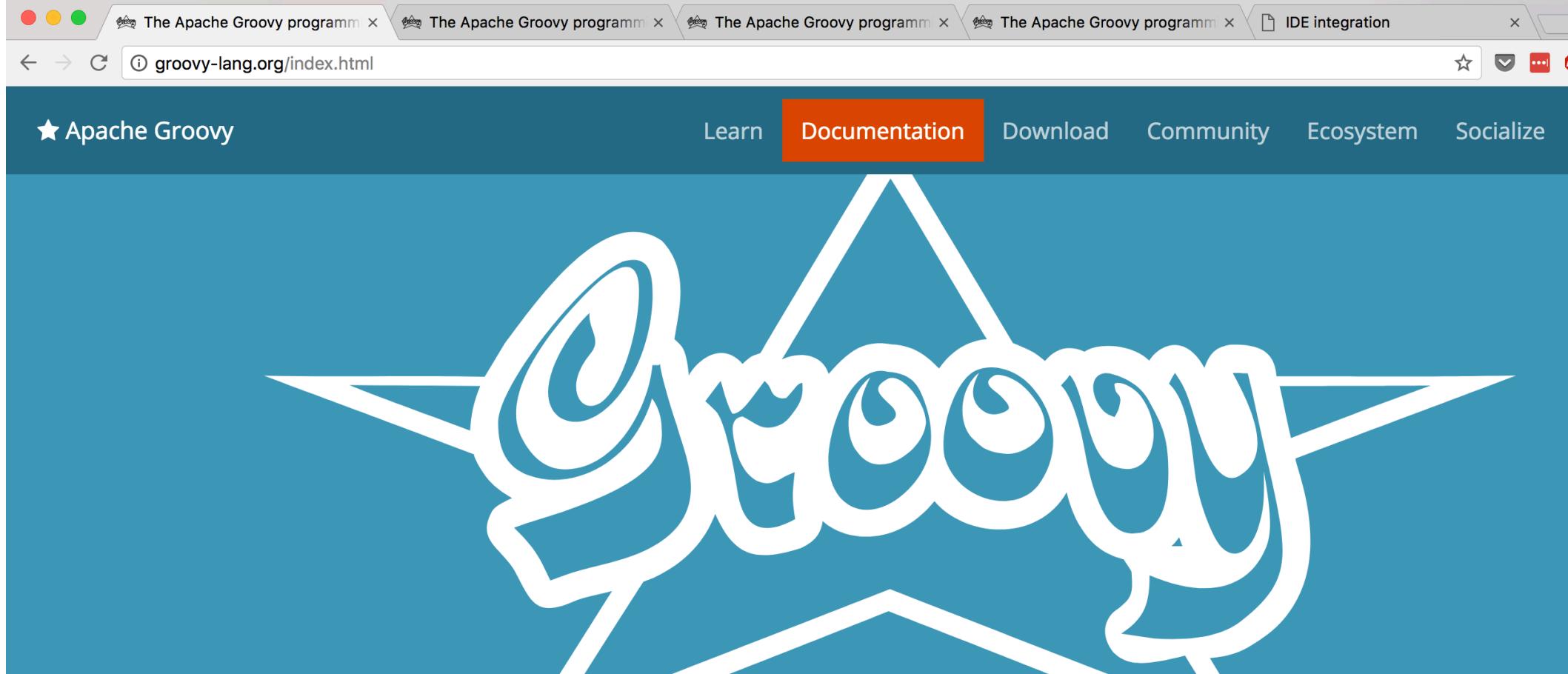
# 6 Lines of Groovy or 40 of Java... Same output

```
Mon May 15 19:14 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ groovy GroovyPersonDemo.groovy
GroovyPerson(name:null, dob:null)
GroovyPerson(name:Erik, dob:Mon May 15 19:14:19 CDT 2017)
```

```
o Thu May 11 22:44 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ java PersonDemo
S Person(name:null, dob:null)
Person(name:Erik, dob:Tue May 16 22:44:52 CDT 2017)
```

Where can I learn more

# Start at the Groovy Website



# So Much Great Info Here

Documentation

- # Getting started
- # Language Specification
- # Tools
- # Groovy module guides
- # API documentation
- # Documentation for other versions
- FAQ

Must read  
for Java  
devs

Then read  
this one

## ☰ Documentation

Improve this doc

The documentation is available as a [single-page document](#), or feel free to pick at a direct section below.

You can also browse [documentation for other versions](#).

### 🎓 Getting started

- [Download Groovy](#)
- [Install Groovy](#)
- [Differences with Java](#)
- [The Groovy Development Kit](#)
- [Runtime and compile-time metaprogramming](#)
- [The Grape dependency manager](#)
- [Testing guide](#)
- [Domain-Specific Languages](#)
- [Integrating Groovy into applications](#)
- [Security](#)
- [Design patterns in Groovy](#)
- [Style guide](#)

### 📦 Groovy module guides

- [Parsing and producing JSON](#)
- [Working with a relational database](#)
- [Processing XML](#)
- [Scripting Ant tasks](#)
- [Template engines](#)
- [Creating Swing UIs](#)
- [Servlet support](#)

### 🎓 Language Specification

- [Syntax](#)
- [Operators](#)
- [Program structure](#)
- [Object orientation](#)
- [Closures](#)
- [Semantics](#)

### ⚙️ Tools

- [groovyc — the Groovy compiler](#)
- [groovysh — the Groovy command -like shell](#)
- [groovyConsole — the Groovy Swing console](#)
- [IDE integration](#)

### </> API documentation

- [GroovyDoc documentation of the Groovy APIs](#)
- [The Groovy Development Kit enhancements](#)

Groovy  
basics

Bookmark  
this

and  
this

# Groovy API Groovy Doc

The screenshot shows a web browser displaying the Apache Groovy API documentation at [www.groovy-lang.org/api.html](http://www.groovy-lang.org/api.html). The page title is "The Apache Groovy prog". The main navigation bar includes links for Learn, Documentation, Download, Support, Contribute, Ecosystem, Socialize, and a search icon. A red "Fork me on GitHub" button is visible in the top right corner. The left sidebar lists various annotations under the package `groovy.transform`, such as `groovy.swing.factory`, `groovy.test`, `groovy.text`, `groovy.text.markup`, `groovy.time`, `groovy.transform`, `groovy.transform.builder`, `immutable`, `IndexedProperty`, `InheritConstructors`, `Memoized`, `NotYetImplemented`, `PackageScope`, `SelfType`, `Sortable`, `SourceURI`, `Synchronized`, `TailRecursive`, `ThreadInterrupt`, `TimedInterrupt`, `ToString`, `Trait`, and `TupleConstructor`. The central content area is titled "[Java] Annotation Type ToString" and describes the `groovy.transform.ToString` annotation. It explains that it is used to assist in creating `toString()` methods and provides an example code snippet:

```
@ToString  
class Customer {  
    String first, last  
    int age  
    Date since = new Date()  
    Collection favItems  
    private answer = 42  
}
```

# Groovy JDK Enhancement Doc

The screenshot shows a web browser window titled "The Apache Groovy program" displaying the URL [www.groovy-lang.org/gdk.html](http://www.groovy-lang.org/gdk.html). The page is part of the "Apache Groovy" website. The navigation bar includes links for Learn, Documentation, Download, Support, Contribute, Ecosystem, Socialize, and a search icon. A red "Fork me on GitHub" button is visible in the top right corner. The left sidebar lists various Java packages under "All Classes", with "Packages" currently selected. The main content area displays two method descriptions:

**Since:** 2.2

**public int size()**

Provide the standard Groovy size() method for String.

**Returns:**  
the length of the String

**Since:** 1.0

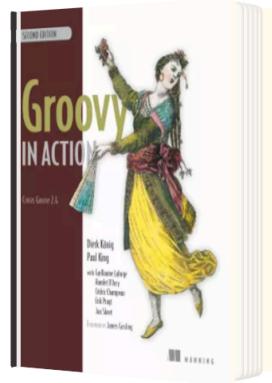
**public Boolean toBoolean()**

Converts the given string into a Boolean object. If the trimmed string is "true", "y" or "1" (ignoring case) then the result is true otherwise it is false.

**Returns:**  
The Boolean value

**Since:** 1.0

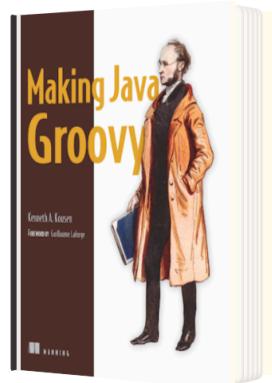
# Numerous Great Books



## Groovy in Action, Second Edition

By Dierk König, Paul King, Guillaume Laforge, Hamlet D'Arcy, Cédric Champeau, Erik Pragt, and Jon Skeet

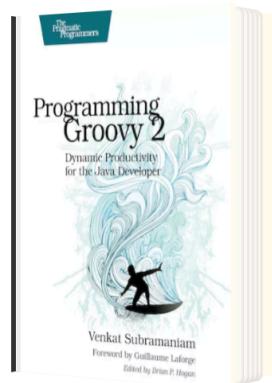
The undisputed definitive reference on the Groovy programming language, authored by core members of the development team.



## Making Java Groovy

By Ken Kousen

Make Java development easier by adding Groovy. Each chapter focuses on a task Java developers do, like building, testing, or working with databases or restful web services, and shows ways Groovy can help.

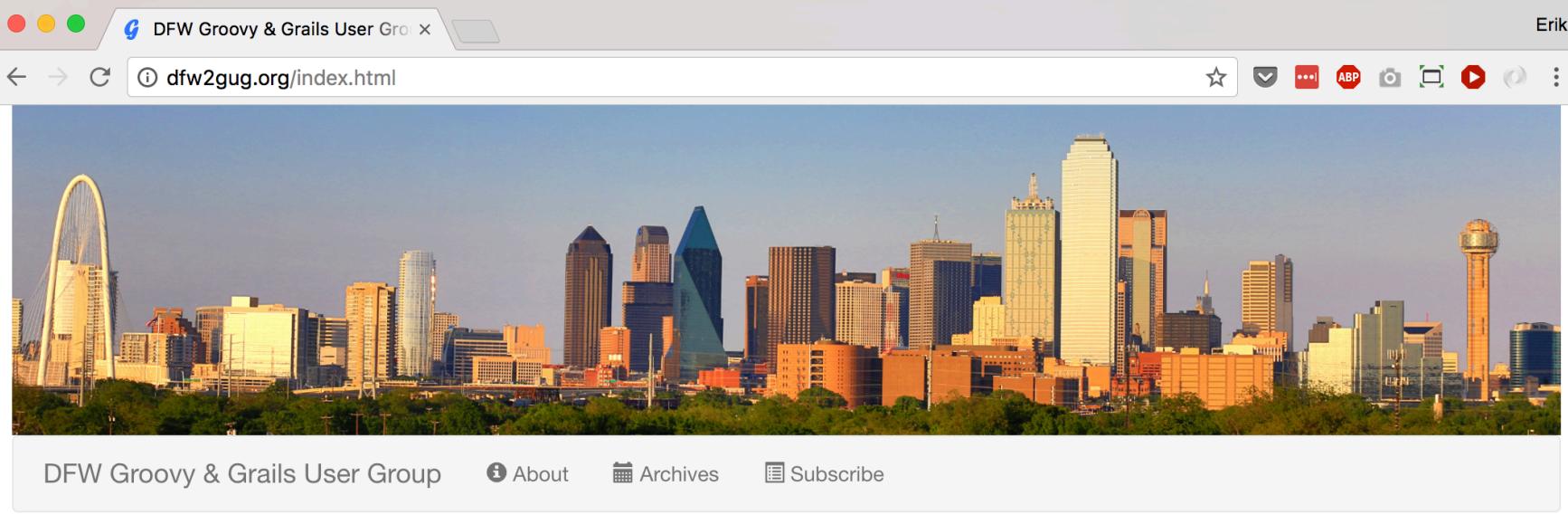


## Programming Groovy 2

By Venkat Subramaniam

Dynamic productivity for the Java developer

# Obviously the DFW2GUG (DFW Groovy Grails Users Group)



The screenshot shows a web browser window for the DFW2GUG website. The title bar reads "DFW Groovy & Grails User Gro x". The address bar shows "dfw2gug.org/index.html". The main content area features a large, scenic photograph of the Dallas city skyline at sunset, with the Margaret Hunt Hill Bridge on the left and various skyscrapers like the Bank of America Plaza and the Reunion Tower on the right. Below the image, the website's navigation menu includes links for "DFW Groovy & Grails User Group", "About", "Archives", and "Subscribe". A callout box titled "Information" provides details about the user group's focus on Groovy and Grails development skills, meeting frequency, and location (5445 Legacy Drive, Plano, TX 75024).

## Meetings

### Planning

03 May 2017 - None

Gathering Groovy 101 topics and assigning presenters.

# Great Online Course from Dan Vega

## Courses

Another great resource for learning Groovy is by watching a course. You could spend time hunting down various videos on the web but these courses have all the information you need packed into one place.



### [The Complete Apache Groovy Developer Course](#)

By Dan Vega

I am going to teach you everything you need to know to start using The Groovy Programming language. This course is really designed for 2 different types of people and I think both will benefit from it. If you're a beginner programmer with a some experience in another language like Python or Ruby this course is for you. Dynamic languages are generally thought of as easier for total beginners to learn because they're flexible and fun. If you're an existing Java Developer (Beginner or Experienced) this course is also for you.

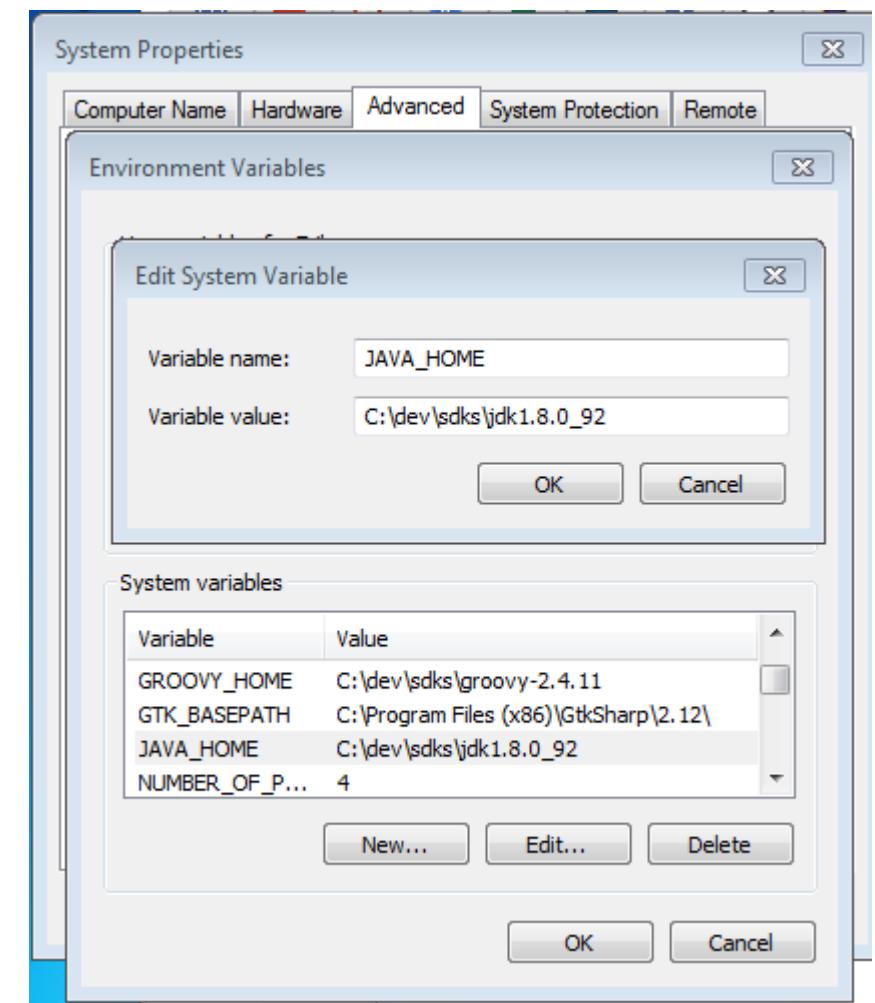
This course is packed with almost 14 hours of content. We are going to start off with getting your development environment up and running and then go through the very basics of the language. From there we are going to build on that in each section cover topics like closures, meta-programming, builders and so much more. I feel like this is one of the most complete courses around and I am excited for you to join me on this adventure.

How do I use it...

# You Need a JVM and JAVA\_HOME

The screenshot shows the Oracle Java SE Downloads page. At the top, there's a navigation bar with the Oracle logo, a menu icon, a search bar, and a sign-in link. Below the navigation is a breadcrumb trail: Oracle Technology Network > Java > Java SE > Downloads. The main content area has tabs for Overview, Downloads (which is selected), Documentation, Community, Technologies, and Training. On the left is a sidebar with links for Java SE, Java EE, Java ME, Java SE Support, Java SE Advanced & Suite, Java Embedded, Java DB, Web Tier, Java Card, Java TV, New to Java, Community, and Java Magazine. The central part of the page displays two download options: "Java Platform (JDK) 8u131" with a Java logo and "NetBeans with JDK 8" with a NetBeans logo, both with "DOWNLOAD" buttons.

```
17
18 export JAVA_HOME=$(/usr/libexec/java_home -v 1.8)
19
```



# Then There are Many Options to Install Groovy



```
Tue May 16 22:33 erik@Eriks-MBP ~  
$ curl -s "https://get.sdkman.io" | bash
```

```
Tue May 16 22:32 erik@Eriks-MBP ~  
$ sdk install groovy
```

## 5. Install Binary

These instructions describe how to install a binary distribution of Groovy.

- First, [Download](#) a binary distribution of Groovy and unpack it into some file on your local file system.
- Set your `GROOVY_HOME` environment variable to the directory you unpacked the distribution.
- Add `GROOVY_HOME/bin` to your `PATH` environment variable.
- Set your `JAVA_HOME` environment variable to point to your JDK. On OS X this is `/Library/Java/Home`, on other unixes its often `/usr/java` etc. If you've already installed tools like Ant or Maven you've probably already done this step.



# groovysh

```
Tue May 16 22:41 erik@Eriks-MBP ~
$ groovysh
Groovy Shell (2.4.7, JVM: 1.8.0_92)
Type ':help' or ':h' for help.
-----
groovy:000> println 'Hello, world'
Hello, world
==== null
groovy:000> class Foo {
groovy:001> def bar() {
groovy:002> println 'baz'
groovy:003> }
groovy:004> }
==== true
groovy:000> foo = new Foo()
==== Foo@17d88132
groovy:000> foo.bar()
baz
==== null
groovy:000> :doc java.util.Li
LinkedHashMap          LinkedHashMap          LinkedList
List                  ListIterator           ListResourceBundle
groovy:000> :doc java.util.List
http://docs.oracle.com/javase/8/docs/api/java/util/List.html
http://docs.groovy-lang.org/2.4.7/html/groovy-jdk/java/util>List.html
groovy:000> █
```

# groovyc

```
Mon Jun 05 22:36 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ ls
App.groovy      Member.groovy

Mon Jun 05 22:36 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ groovyc *.groovy

Mon Jun 05 22:36 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ ls
App.class       App.groovy      Member.class     Member.groovy

Mon Jun 05 22:36 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ groovy App
Member(Erik Weibust, 43)

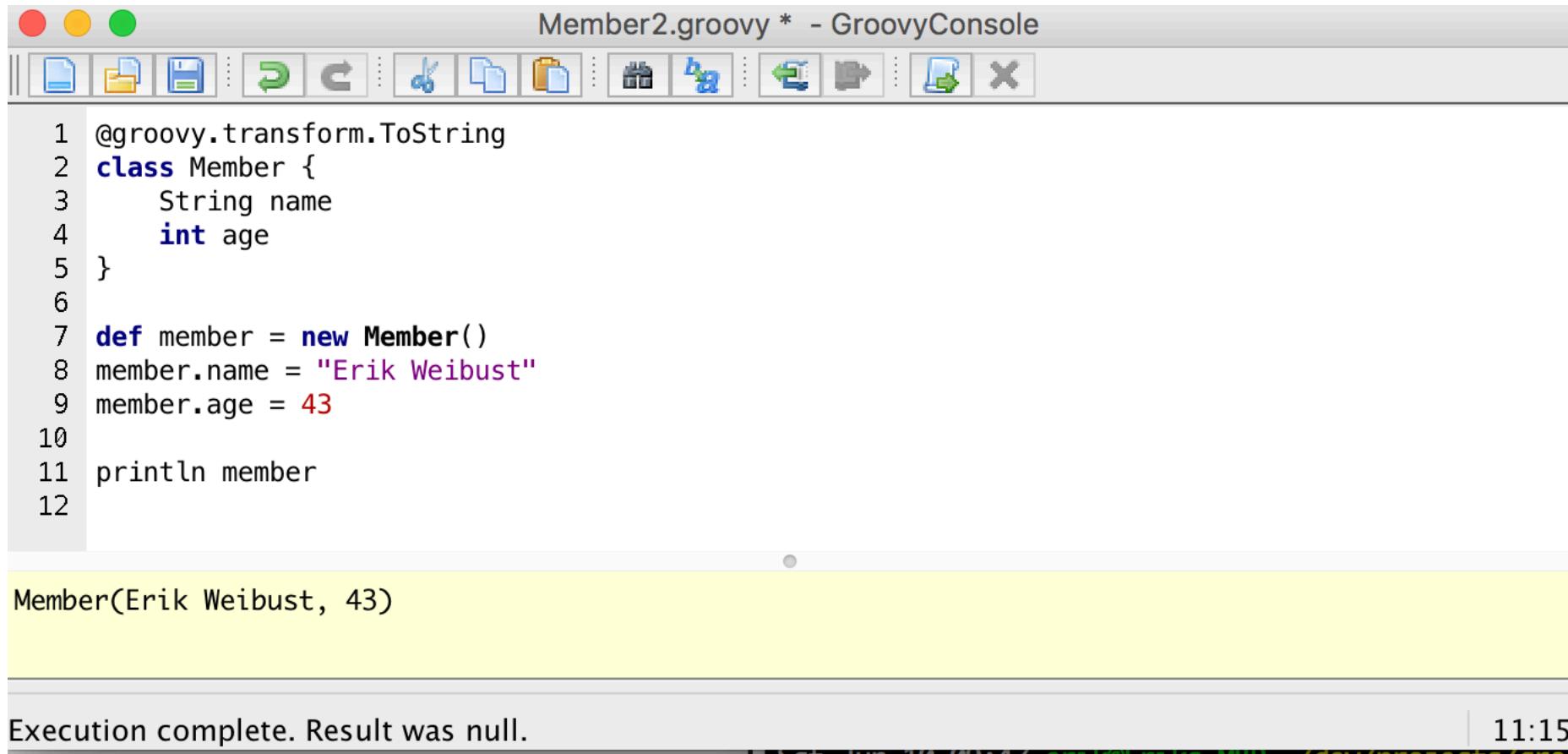
Mon Jun 05 22:36 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ java -cp /Users/erik/.sdkman/candidates/groovy/current/embeddable/groovy-all-2
.4.7.jar: App
Member(Erik Weibust, 43)
```

# groovyc (cont.)

```
Mon Jun 05 22:34 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ cat Member.groovy
 1  @groovy.transform.ToString
 2  class Member {
 3      String name
 4      int age
 5  }

Mon Jun 05 22:34 erik@Eriks-MBP ~/dev/projects/groovy/groovy_talk
$ cat App.groovy
 1  def member = new Member( name:'Erik Weibust', age:43 )
 2  println member
```

# Groovy Console (dare I say IDE?)



The image shows a screenshot of the GroovyConsole IDE. The title bar reads "Member2.groovy \* - GroovyConsole". The toolbar contains standard file operations like Open, Save, and Cut/Paste. The code editor displays the following Groovy script:

```
1 @groovy.transform.ToString
2 class Member {
3     String name
4     int age
5 }
6
7 def member = new Member()
8 member.name = "Erik Weibust"
9 member.age = 43
10
11 println member
12
```

The output window below shows the result of the script execution:

```
Member(Erik Weibust, 43)
```

The status bar at the bottom indicates "Execution complete. Result was null." and the time "11:15".

# Groovy Console – AST Browser

The image shows two windows of the Groovy development environment. The top window is the 'Groovy AST Browser' showing the structure of a 'Member' class node. The bottom window is the 'GroovyConsole' showing the execution of a script.

**Groovy AST Browser (Left Window):**

- At end of Phase: Output
- Refresh button
- Tree view:
  - ClassNode – script1497106342200
  - ClassNode – Member
- Table view:

Name	Value	Type
abstractMethods	null	List
allDeclaredMethods	[MethodNode@1813098664[void no...]	List
allInterfaces	[groovy.lang.GroovyObject]	Set
annotated	true	boolean
annotationDefinition	false	boolean
annotations	[org.codehaus.groovy.ast.Annotation...]	List
array	false	boolean
class	class org.codehaus.groovy.ast.ClassN...	Class
columnNumber	1	int
compileUnit	org.codehaus.groovy.ast.CompileUnit...	CompileUnit
componentType	null	ClassNode
- Source tab (selected)
- Bytecode tab
- Code preview:

```
@groovy.transform.ToString
public class Member implements groovy.lang.GroovyObject extends java.lang.Object {

    private java.lang.String name
    private int age
    private static org.codehaus.groovy.reflection.ClassInfo $staticClassInfo
    public static transient boolean __$stMC
    private transient groovy.lang.MetaClass metaClass

    public Member() {
        metaClass = /*BytecodeExpression*/
    }

    public java.lang.String toString() {
        java.lang.Object _result = new java.lang.StringBuilder()
        java.lang.Object $toStringFirst = true
        _result.append('Member')
        if ( $toStringFirst ) {
            $toStringFirst = false
        } else {
            _result.append(',')
        }
        if ( this.getName().is(this) ) {
            _result.append('this')
        } else {
            _result.append(org.codehaus.groovy.runtime.InvokerHelper.toString(this.getName()))
        }
        if ( $toStringFirst ) {
            $toStringFirst = false
        } else {
            _result.append(',')
        }
        if ( this.getAge().is(this) ) {
            _result.append('this')
        } else {
    }
```

**GroovyConsole (Bottom Window):**

- File menu
- Edit menu
- View menu
- History menu
- Script menu (selected)
- Run ⌘R
- Auto Save on Runs
- Run Selection ⌘⇧R
- Allow Interruption
- Interrupt
- Compile ⌘L
- Add Jar(s) to ClassPath
- Add Directory to ClassPath
- Clear Script Context
- Inspect Last ⌘I
- Inspect Variables ⌘J
- Inspect Ast ⌘T (selected)

Code preview:

```
1 @groovy.transform.ToString
2 class Member {
3     String name
4     int age
5 }
6
7 def member = new Member()
8 member.name = "Erik Weibust"
9 member.age = 43
10
11 println member
12
```

Status bar: Member@Erik Weibust 43

Questions?

# Thanks for coming!

- You can find the example code in my GitHub Repo at:
  - <https://github.com/erikweibust/WhatsSoGroovy>
  - Feel free to Watch, Star and Fork 😊
- The slides are also available in the above mentioned repo
- Follow me on twitter at: <https://twitter.com/erikweibust>
- Connect on LinkedIn at: <https://www.linkedin.com/in/erikweibust/>