



## What is Geronimo?



## Apache Geronimo Unleashed

By Jeff Genender



## What is Geronimo?

Is It J2EE?



Jeff Genender



## What is Geronimo?



## Topics

- What is Geronimo?
- Architecture
- Using Geronimo
- Configuring Geronimo
- What Geronimo doesn't have
- Concerns...
- Whats Next?



## Architecture - Kernel

- Kernel - This \*is\* what is known as Geronimo!
- Kernel control's component (GBean) Lifecycle
- Manages Dependencies (Which GBean depends on what)
- IoC (Inversion of Control) container



## What is Geronimo?

- Collection Pre Configured Assemblies
  - j2ee-tomcat-server
  - j2ee-jetty-server
  - minimal-tomcat-server
  - minimal-jetty-server
- Is it J2EE? Yes!
  - J2EE 1.4 Certified
- Why another J2EE Server?
  - J2EE is commodity
  - Apache License is good!
  - Future certified stacks



## Architecture - GBeans

- JSR-77 (J2EE Management Specification)
  - Lifecycle & Running States
  - Naming Conventions
- Enough Jargon! What's a GBean?
  - The Glue
  - The Wrapper
  - The Plugin to the Kernel



## What is Geronimo?

- Top Level Apache Project
  - The Geronimo API/Kernel/Assemblies/App Server
  - GBuild - Open Source Testing
  - DevTools - Eclipse Plugin For Geronimo Application Development With the Web Tools platform (WTP)
  - J2EE Specifications - Open Source Version
    - Great for Maven Repo!
  - Home for OpenEJB, ActiveMQ, ServiceMix, Yoko (CORBA), XBean
    - These are Stand Alone Sub-Projects



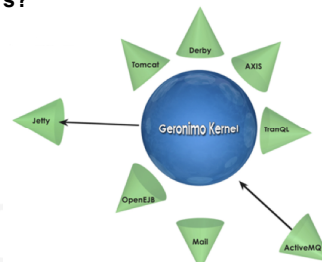
## Architecture - GBean

```
public interface GBeanLifecycle {
    public void doStart();
    public void doStop();
    public void doFail();
}
```



## Architecture

- What makes Geronimo different from all other app servers?





## Directory Structure

```

$GERONIMO_HOME
|
+---/bin
|
+---/config-store
|
+---/deploy
|
+---/docs
|
+---/lib
|
+---/repository
|
+---/schema
|
+---/var

```



## Architecture - GBean IoC with the Plan File

```

...
<gbean gbeanName="geronimo.server:name=DirectoryService"
  class="org.apache.geronimo.directory.DirectoryGBean">
  <attribute name="providerURL">ou=system</attribute>
  <attribute name="securityAuthentication">simple</attribute>
  <attribute name="securityPrincipal">uid=admin,ou=system</attribute>
  <attribute name="securityCredentials">secret</attribute>
  <attribute name="anonymousAccess">true</attribute>
  <attribute name="enableNetworking">true</attribute>
  <attribute name="host">0.0.0.0</attribute>
  <attribute name="port">1389</attribute>
  <reference name="ServerInfo">
    <module>geronimo/j2ee-system/1.1-SNAPSHOT/car</module>
    <name>ServerInfo</name>
  </reference>
</gbean>
...

```



## VAR Directory Structure

```

$GERONIMO_HOME/var
|
+---activemq
|
+---catalina
|
+---config---+
|             |
|             +---config.xml
|             |
+---derby
|
+---ldap
|
+---log-----+
|
+---security---+---keystore
|
+---temp
|
+---txlog
|
+---client-log4j.properties
|
+---server-log4j.properties
|
+---deployer-log4j.properties
|
+---geronimo.log

```



## Architecture - GBean

- **Simple Development**
  - Implement the GBeanLifecycle
  - Declare the GBean in a Plan (IoC) and Deploy It!
- **Plugging in 3rd party components is easy!**
  - Apache Directory
  - Quartz - Open Symphony Integration
    - <http://www-128.ibm.com/developerworks/library/os-ag-thirdparty/index.html>
- **Do I care?**
  - Yes, because its how you configure Geronimo
  - No, because you probably will never write one (this is architecture)

Enough already! Lets get on to the good stuff...



## REPOSITORY Directory Structure


```

$GERONIMO_HOME/repository
|
+---/...
|
+---/commons-logging---+
|                       |
|                       +---/jars---+
|                       |
|                       +---commons-logging-1.0.4.jar
|
+---/...

```



## Using Geronimo

- **Download it from...**


**Apache Geronimo**  
<http://geronimo.apache.org/>
- **Currently available in 2 forms**
  - Tomcat
  - Jetty
  - Installer soon...
  - More assemblies to come...
- **Available as ZIP or TGZ**
  - Unzip/Untar In your favorite location



## Geronimo Running Foreground...

```
[*****] 100% 59s Startup complete
Listening on Ports:
 1099 0.0.0.0 RMI Naming
 1389 0.0.0.0 Apache Directory LDAP
 1527 0.0.0.0 Derby Connector
 4201 0.0.0.0 ActiveIO Connector EJB
 4242 0.0.0.0 Remote Login Listener
 8009 0.0.0.0 Tomcat Connector AJP
 8080 0.0.0.0 Tomcat Connector HTTP
 9091 0.0.0.0 Tomcat Connector Blah
 61616 0.0.0.0 ActiveMQ Message Broker Connector

Started Application Modules:
EAR: geronimo/daytrader-derby-tomcat/1.0/car
EAR: geronimo/juddi-tomcat/1.0/car
EAR: geronimo/webconsole-tomcat/1.0/car
RAR: geronimo/activemq/1.0/car
RAR: geronimo/system-database/1.0/car
WAR: geronimo/jmxdebug-tomcat/1.0/car
WAR: geronimo/jsp-examples-tomcat/1.0/car
WAR: geronimo/ldap-demo-tomcat/1.0/car
WAR: geronimo/remote-deploy-tomcat/1.0/car
WAR: geronimo/servlets-examples-tomcat/1.0/car
WAR: geronimo/welcome-tomcat/1.0/car
```



## BIN Directory Structure

```
$GERONIMO_HOME/bin
|
+---/client.jar
|
+---/server.jar
|
+---/deploy.sh (bat)
|
+---/geronimo.sh (bat)
|
+---/setjavaenv.sh (bat)
|
+---/startup.sh (bat)
|
+---/shutdown.sh (bat)
```



## Geronimo Running Foreground...

### Web Applications:

```
http://powerbook.local:8080/
http://powerbook.local:8080/console
http://powerbook.local:8080/console-standard
http://powerbook.local:8080/daytrader
http://powerbook.local:8080/debug-tool
http://powerbook.local:8080/jsp-examples
http://powerbook.local:8080/juddi
http://powerbook.local:8080/ldap-demo
http://powerbook.local:8080/remote-deploy
http://powerbook.local:8080/servlets-examples
```

Geronimo Application Server started



## Starting Geronimo

- **startup.sh**
- **geronimo.sh**
- **java -jar ./server.jar**

```
Usage: geronimo.sh command [geronimo_args]
commands:
 debug          Debug Geronimo in jdb debugger
 jpda start     Start Geronimo under JPDA debugger
 run           Start Geronimo in the foreground
 start         Stop Geronimo in the background
 stop         Stop Geronimo
 stop --force  Stop Geronimo (followed by kill -KILL)

args for debug, jpda start, run and start commands:
 --quiet       No startup progress
 --long       Long startup progress
 -v           INFO log level
 --vv         DEBUG log level
 --override   Override configurations. USE WITH CAUTION!
 --help       Detailed help.

args for stop command:
 --user       Admin user
 --password  Admin password
 --port      RMI port to connect to
```



## Web Startup

The screenshot shows the Apache Geronimo web startup page. It features a navigation menu on the left with sections for Documentation, Geronimo Online, and Geronimo Examples. The main content area contains a welcome message and instructions for users, including information about the default home page, how to specify a context root, and how to stop the application. It also provides a list of Geronimo mailing lists and a link to the Geronimo project website.



## Stopping Geronimo

- **shutdown.sh**
- **geronimo.sh stop**
- **java -jar shutdown.jar**
- **The old 2 finger salute**
  - **Control-C (or Break)**
  - **Kicks in the Java shutdown hook for Geronimo**

## Deployer Tool

Command-line deployer syntax:  
 deployer [general options] command [command options]

The general options are:

- url
- host
- port
- driver
- user
- password
- syserr
- verbose

The available commands are:

1. Common Commands
  - deploy
  - login
  - redeploy
  - start
  - stop
  - undeploy
2. Other Commands
  - distribute
  - list-modules
  - list-targets

## Web Console

## Plan Files

- What is a plan file?
  - XML document (External or Internal depending on nature of plan file)
  - Descriptor to extend application
    - geronimo-application.xml - embedded
    - geronimo-web.xml - embedded
    - geronimo-ra.xml - embedded
    - Any name you desire - external
  - Describes...
    - GBean's attributes and references
    - GBean's dependencies
  - Many different types of plans to describe information
    - Web, Application, Resource Adapters, Security
    - Security, Naming References, EJB
    - Schemas found in the schema directory

## Web Console Continued.

## Elements of a plan file

```
<module xmlns="http://geronimo.apache.org/xml/ns/deployment-1.1">
  <environment>
    <moduleId>
      <groupId>org.apache.geronimo.configs</groupId>
      <artifactId>directory</artifactId>
      <version>1.2-SNAPSHOT</version>
      <type>car</type>
    </moduleId>
    <dependencies>
      <dependency>
        <groupId>org.apache.geronimo.modules</groupId>
        <artifactId>geronimo-directory</artifactId>
        <version>1.1.1</version>
        <type>jar</type>
        <import>classes</import>
      </dependency>
      ...
      <dependency>
        <groupId>org.apache.geronimo.configs</groupId>
        <artifactId>j2ee-server</artifactId>
        <type>car</type>
      </dependency>
    </dependencies>
    <hidden-classes/>
    <non-overridable-classes/>
  </environment>
</module>
```

## Deploying Applications

- Web Console
  - Install New Applications
    - Archive:  Browse...
    - Plan:  Browse...
    - Start app after install
    - Install
- The deployer directory
  - Use for development only...Not recommended for production
- The deployer tool - deployer.sh (bat) script
  - deployer.sh --user system --password manager deploy [war/jar/ear] [plan file]



## Configuring Geronimo - config.xml

```

<attributes xmlns="http://geronimo.apache.org/xml/ns/attributes-1.1">
...
  <module name="org.apache.geronimo.configs/tomcat/1.1.1/car">
    ...
    <gbean name="TomcatWebConnector">
      <attribute name="host">0.0.0.0</attribute>
      <attribute name="port">8080</attribute>
      <attribute name="redirectPort">8443</attribute>
    </gbean>
    <gbean name="TomcatWebSSLConnector" load="false">
    </gbean>
    <gbean beanInfo="org.apache.geronimo.tomcat.HostGBean" name="geronimo/tomcat/
1.1/car?ServiceModule=geronimo/tomcat/1.1/
car,j2eeType=Host,name=TomcatVirtualHost_1">
      <attribute name="className">org.apache.catalina.core.StandardHost</attribute>
      <attribute name="initParams">
        name=www.example.com
        appBase=
        workDir=work</attribute>
      <attribute name="aliases">www.example.net www.example.org</attribute>
    </gbean>
    ...
  </configuration>
  ...
</attributes>

```



```

...
  <gbean gbeanName="geronimo.server:name=DirectoryService"
        class="org.apache.geronimo.directory.DirectoryGBean">
    <attribute name="providerURL">ou=system</attribute>
    <attribute name="securityAuthentication">simple</attribute>
    <attribute name="securityPrincipal">uid=admin,ou=system</attribute>
    <attribute name="securityCredentials">secret</attribute>
    <attribute name="anonymousAccess">true</attribute>
    <attribute name="enableNetworking">true</attribute>
    <attribute name="host">0.0.0.0</attribute>
    <attribute name="port">1389</attribute>
    <reference name="ServerInfo">
      <name>ServerInfo</name>
    </reference>
  </gbean>
</configuration>

```



## Configuring Application Servers



## Elements of a plan file - web

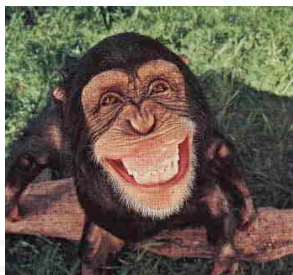
```

<web-app xmlns="http://geronimo.apache.org/xml/ns/j2ee/web/tomcat-1.1"
xmlns:sec="http://geronimo.apache.org/xml/ns/security">
  <environment>
    <moduleId>
      <groupId>org.apache.geronimo.configs</groupId>
      <artifactId>ldap-demo-tomcat</artifactId>
      <version>1.2-SNAPSHOT</version>
      <type>car</type>
    </moduleId>
    <dependencies>
      ...
    </dependencies>
    <hidden-classes/>
    <non-overridable-classes/>
  </environment>
  <context-root>/ldap-demo</context-root>

```



## Configuring Geronimo - Web Console



```

...
<security-realm-name>ldap-realm</security-realm-name>
<security>
  <default-principal realm-name="ldap-realm">
    <principal class="org.apache.geronimo.security.realm.providers.GeronimoUserPrincipal"
      name="system"/>
  </default-principal>
  <role-mappings>
    <role role-name="content-administrator">
      <realm realm-name="ldap-realm">
        <principal class="org.apache.geronimo.security.realm.providers.GeronimoGroupPrincipal"
          name="admin" designated-run-as="true"/>
        <principal class="org.apache.geronimo.security.realm.providers.GeronimoUserPrincipal"
          name="system"/>
      </realm>
    </role>
    <role role-name="guest">
      <realm realm-name="ldap-realm">
        <principal class="org.apache.geronimo.security.realm.providers.GeronimoGroupPrincipal"
          name="guest" designated-run-as="true"/>
        <principal class="org.apache.geronimo.security.realm.providers.GeronimoUserPrincipal"
          name="user1"/>
        <principal class="org.apache.geronimo.security.realm.providers.GeronimoUserPrincipal"
          name="user2"/>
      </realm>
    </role>
  </role-mappings>
</security>
</web-app>

```



## Configuring Geronimo - Start/Stop/Remove Components

Installed System Modules <span>[view]</span>			
Component Name	State	Commands	
geronimo/activemq-broker/1.0/car	running	Stop	Uninstall
geronimo/client-corba/1.0/car	stopped	Start	Uninstall
geronimo/client-security/1.0/car	stopped	Start	Uninstall
geronimo/client-system/1.0/car	stopped	Start	Uninstall
geronimo/client/1.0/car	stopped	Start	Uninstall
geronimo/directory/1.0/car	running	Stop	Uninstall
geronimo/geronimo-gbean-deployer/1.0/car	running	Stop	Uninstall
geronimo/hot-deployer/1.0/car	running	Stop	Uninstall
geronimo/j2ee-corba/1.0/car	stopped	Start	Uninstall
geronimo/j2ee-deployer/1.0/car	running	Stop	Uninstall
geronimo/j2ee-security/1.0/car	running	Stop	Uninstall
geronimo/j2ee-server/1.0/car	running	Stop	Uninstall
geronimo/j2ee-system/1.0/car	running	Stop	Uninstall
geronimo/jdap-realm/1.0/car	running	Stop	Uninstall
geronimo/online-deployer/1.0/car	stopped	Start	Uninstall
geronimo/rmi-naming/1.0/car	running	Stop	Uninstall
geronimo/shutdown/1.0/car	stopped	Start	Uninstall
geronimo/tomcat-deployer/1.0/car	running	Stop	Uninstall
geronimo/tomcat/1.0/car	running	Stop	Uninstall



## Configuring Geronimo Web Console

### Logging - Server Logs

Log Manager	
Config File	<input type="text" value="var/log/server-log4j.properties"/>
Refresh Period	<input type="text" value="60"/>
Log Level	<input type="text" value="INFO"/>
<input type="button" value="Update"/> <input type="button" value="Reset"/>	

### Connectors - Web Server

Network Listeners <span>help [view]</span>						
Name	Protocol	Port	State	Actions	Type	
TomcatWebConnector-HTTP-Blah	HTTP	9091	running	stop edit delete	Tomcat Connector	
TomcatAJPConnector	AJP	8009	running	stop edit delete	Tomcat Connector	
TomcatWebConnector	HTTP	8080	running	stop edit delete	Tomcat Connector	

[Add new HTTP listener for Tomcat](#)  
[Add new HTTPS listener for Tomcat](#)  
[Add new AJP listener for Tomcat](#)



## Configuring Geronimo - Start/Stop/Remove Applications

Installed Web Applications <span>[view]</span>			
Component Name	State	Commands	
geronimo/jmxdebug-tomcat/1.0/car	running	Stop	Uninstall
geronimo/jsp-examples-tomcat/1.0/car	running	Stop	Uninstall
geronimo/jdap-demo-tomcat/1.0/car	running	Stop	Uninstall
geronimo/remote-deploy-tomcat/1.0/car	running	Stop	Uninstall
geronimo/servlets-examples-tomcat/1.0/car	running	Stop	Uninstall
geronimo/welcome-tomcat/1.0/car	stopped	Start	Uninstall



## Configuring Geronimo - Connector Wizard

Network Listeners <span>help [view]</span>	
<b>Add new HTTPS listener for Tomcat</b>	
Unique Name:	<input type="text"/>
A name that is different than the name for any other web connectors in the server (no spaces in the name please)	
Host:	<input type="text"/>
The host name or IP to bind to. The normal values are 0.0.0.0 (all interfaces) or localhost (local connections only)	
Port:	<input type="text"/>
The network port to bind to.	
Max Threads:	<input type="text" value="50"/>
The maximum number of threads this connector should use to handle incoming requests	
<b>SSL Settings</b>	
Keystore File:	<input type="text"/>
The file that holds the keystore (relative to the Geronimo install dir)	
Keystore Password:	<input type="text"/>
Set the password used to access the keystore file. This is also the password used to access the server private key within the keystore (so the two passwords must be set to be the same on the keystore).	
Keystore Type:	<input type="text" value="JKS"/>



## Configuring Geronimo - Keystore

Keystore Configuration <span>[view]</span>			
keystore-type	keystore-provider	keystore-location	keystore-size
jks	SUN	var/security/ssl-keystore-1	0
Tools: <a href="#">import trusted certificate</a> <a href="#">generate key pair</a>			
details alias-name alias-type modified			
Keystore Configuration <span>[view]</span>			
Generate Key Pair			
Alias:	<input type="text"/>		
Key Algorithm:	<input checked="" type="radio"/> RSA		
Key Size:	<input checked="" type="radio"/> 512 <input checked="" type="radio"/> 1024 <input type="radio"/> 2048		
Signature Algorithm:	<input type="radio"/> MD2withRSA <input checked="" type="radio"/> MD5withRSA <input type="radio"/> SHA1withRSA		
Validity:	<input type="text"/>		
Common Name (CN):	<input type="text"/>		
Organizational Unit (OU):	<input type="text"/>		
Organizational Name (O):	<input type="text"/>		
Locality (L):	<input type="text"/>		
State (ST):	<input type="text"/>		
Country (C):	<input type="text"/>		
<input type="button" value="Submit"/> <input type="button" value="Reset"/> <input type="button" value="Cancel"/>			



## Configuring Geronimo - Repository

Repository Viewer <span>help [view]</span>	
<b>Add Archive to Repository</b>	
File:	<input type="text"/> <input type="button" value="Browse..."/>
Group:	<input type="text"/>
Artifact:	<input type="text"/>
Version:	<input type="text"/>
Type:	<input type="text"/>
<input type="button" value="Install"/>	
<b>Current Repository Entries</b>	
<ul style="list-style-type: none"> <li>activecluster/activecluster-1.2/20051115174934/jar</li> <li>activevelo/activevelo/2.0-118/jar</li> <li>activemq/activemq-core/3.2.1/jar</li> </ul>	

**Database Pools** [view]

Create Database Pool -- Step 2: Select Driver, JAR, Parameters

**JDBC Driver Class:** com.mysql.jdbc.Driver  
See the documentation for your JDBC driver.

**Driver JAR:** [Select]  
The JAR holding the selected JDBC driver. Should be installed under GERONIMO/repository/ (or [Download a Driver](#))

**DB User Name:** [Text]  
The username used to connect to the database

**DB Password:** [Text]  
The password used to connect to the database

**Driver Connection Properties**

**Typical JDBC URL:** jdbc:mysql://<Host>:<Port>/<Database>

**Port:** 3306  
A property used to connect to MySQL. May be optional (see JDBC driver documentation).

**Host:** [Text]  
A property used to connect to MySQL. May be optional (see JDBC driver documentation).

**Database:** [Text]  
A property used to connect to MySQL. May be optional (see JDBC driver documentation).

[Next](#) [Cancel](#)

## Configuring Geronimo - DB Pools

**Database Pools** [view]

This page lists all the available database pools.

For each pool listed, you can click the **usage** link to see examples of how to use the pool from your application.

Name	Deployed As	State	Actions
SystemDataSource	Server-wide	running	<a href="#">edit</a> <a href="#">usage</a>
jdbc/TradeDataSource	geronimo/daytrader-derby-tomcat/1.0/car	running	<a href="#">edit</a> <a href="#">usage</a>
jdbc/JuddiDB	geronimo/uddi-tomcat/1.0/car	running	<a href="#">edit</a> <a href="#">usage</a>

Create a new database pool:

- [Using the Geronimo database pool wizard](#)
- [Import from JBoss 4](#)
- [Import from WebLogic 8.1](#)

**Database Pools** [view]

Create Database Pool -- Step 2: Select Driver, JAR, Parameters

This page lets you automatically download a driver for a database where the driver JARs are available online without login or registration.

*If this page took a very long time to load and there are no drivers listed in the box below, it probably means your Geronimo installation can't connect to apache.org to retrieve the driver download configuration file. Sorry for the inconvenience, you'll have to try again later or install the driver by hand (copy it to a directory under geronimo/repository/)*

**Select Driver:** MySQL Connector/J 3.1.12 [Select]  
A driver that Geronimo can download automatically for you.

[Next](#) [Cancel](#)

[Return to List](#)

## Configuring Geronimo - DB Pools JBoss Conversion

**Database Pools** [view]

**Import Database Pools -- Step 1: Upload Configuration File**

This page starts the process of importing database pools from another application server. To do the import, you'll need to upload a configuration file from the other server using the fields below. After that, we'll convert the values we can, and ask you to confirm the configuration for each pool we find in the configuration.

**JBoss 4 Import**

**Config File:** [Text] [Browse...](#)

Please select the \*-ds.xml file from the jboss4/server/name/deploy directory.

[Next](#) [Cancel](#)

## What Geronimo doesn't have

- Full clustering with respect to EJB/JNDI/Distributed cache.
  - It \*does\* have full clustering with session replication and fail-over for the Tomcat web component which fits 90% of clustering use cases. Uses Tomcat Clustering GBeans.
- Can't run with Java 5...only runs with Java 1.4.2.
  - Why?

## Configuring Geronimo - DB Pools Wizard

**Database Pools** [view]

Create Database Pool -- Step 1: Select Name and Database

**Name of Database Pool:** MyNewMysqlPool  
A name that is different than the name for any other database pools in the server (no spaces in the name please).

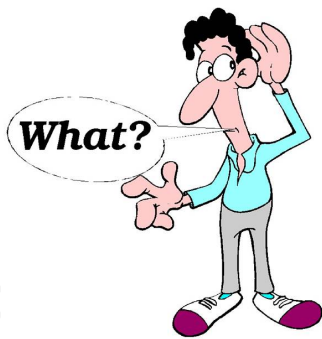
**Database Type:** MySQL [Select]  
The type of database the pool will connect to.

[Next](#) [Cancel](#)





## Questions



- [igenender@apache.org](mailto:igenender@apache.org)



## Concerns...

- **Can I use Geronimo Now? Is it ready for PrimeTime?**
  - YES!!!
- **Its new, is it ready for the Enterprise?**
  - YES!!! J2EE 1.4 Certified...it is guaranteed to run your applications
  - Check it out for yourself! Geronimo has some great company!
    - <http://java.sun.com/j2ee/compatibility.html>
- **1.0 argument does not really apply**
  - Why?



## What's Next for 1.2?

- **Robust Clustering - Not just Web and JMS**
- **Even More User Friendly Configuration and Application Management.**
- **Run with Java 5 - Yoko will fix this...**
- **Java EE 5 Preview...**
- **Much, much more...**



## Get Involved!

- **Visit us at:**



**Apache Geronimo**

<http://geronimo.apache.org/>

- **IRC**
  - [#geronimo](irc.freenode.net)
- **Mailing lists**
  - [dev@geronimo.apache.org](mailto:dev@geronimo.apache.org)
  - [user@geronimo.apache.org](mailto:user@geronimo.apache.org)



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**APACHE GERONIMO**