

WADI Clustering

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Web-applications and Stateful SessionBeans (Geronimo 2.2+) can be clustered by WADI.

In order to cluster these components, their Geronimo deployment descriptors are augmented with specific XML elements. These elements define various clustering parameters controlling how underlying WADI's components are wired and set-up upon application deployment.

Clustering Configurations

The two following configurations, shipped out-of-the-box with JEE5 assemblies, must be installed for clustering to work properly:

- *org.apache.geronimo.configs/clustering//car*: it defines the runtime dependencies that clustered Web applications or EJB modules must have. For instance, it imports the geronimo-clustering JAR into the classpath of such modules. Also, it defines a *Node* GBean defining the unique name of this Geronimo instance in the cluster.
In order to give a specific name to your Geronimo instance, this module can be reconfigured by updating the *clusterNodeName* property defined within *var/config/config-substitutions.properties*: *clusterNodeName=MyOwnNodeName*
- *org.apache.geronimo.configs/wadi-clustering//car*: it defines WADI specific GBeans used to further configure the behaviour of clustered applications and the WADI group communication service shared by all clustered applications to communicate with each others.
This is in this module, by overriding the *DefaultBackingStrategyFactory* GBean, that the default number of replicas, 2, to be maintained across the cluster for a given HTTP session or SFSB instance is configured.
These configurations are automatically started when clustered applications are started. Hence, you should not start them explicitly.

Creating a Static Wadi Configuration

Wadi can be configured to use unicast instead of multicast. To accomplish this, multiple additions need to be added to the wadi-cluster module configuraton in config.xml.

Modifying DispatcherHolder GBean Configuration

To successfully use a unicast configuration, the multicast broadcast service needs to be disabled using the *disableMCastService* attribute.

```
xml <gbean name="DefaultDispatcherHolder"> <attribute name="disableMCastService">true</attribute> </gbean>
```

It's possible to specify the receiver port that the DispatcherHolder will listen on for session updates. If no port is specified then the first available port starting at port 4000 will be chosen automatically.

```
xml <gbean name="DefaultDispatcherHolder"> <attribute name="disableMCastService">true</attribute> <attribute name="receiverPort">4003</attribute> </gbean>
```

A list of static members needs to be defined for a static configuration. Each static member will have it's own gbean configuration in config.xml in the wadi-cluster module. The DefaultDispatchHolder takes a reference to the first static member in the list.

```
xml <gbean name="DefaultDispatcherHolder"> <attribute name="disableMCastService">true</attribute> <attribute name="receiverPort">4003</attribute> <reference name="staticMember"> <pattern> <groupId>org.apache.geronimo.configs</groupId> <artifactId>wadi-clustering</artifactId> <version>2.2-SNAPSHOT</version> <type>car</type> <name>firstStaticMember</name> </pattern> </reference> </gbean>
```

Defining A Static Member

Each static member in the configuration needs to be defined in config.xml. A sample configuration follows:

```
xml <gbean name="org.apache.geronimo.configs/wadi-clustering/2.2-SNAPSHOT/car?ServiceModule=org.apache.geronimo.configs/wadi-clustering/2.2-SNAPSHOT/car,j2eeType=GBean,name=firstStaticMember" gbeanInfo="org.apache.geronimo.clustering.wadi.WadiStaticMember"> <attribute name="className">org.apache.catalina.tribes.membership.StaticMember</attribute> <attribute name="port">4001</attribute> <attribute name="securePort">-1</attribute> <attribute name="domain">test-domain</attribute> <attribute name="UniqueId">0,0,0,0,0,0,0,0,0,0,0,0,0,0,0</attribute> <attribute name="host">9.27.163.151</attribute> <reference name="nextWadiStaticMember"> <pattern> <groupId>org.apache.geronimo.configs</groupId> <artifactId>wadi-clustering</artifactId> <version>2.2-SNAPSHOT</version> <type>car</type> <name>secondStaticMember</name> </pattern> </reference> </gbean>
```

Static Member Attributes

- *className* (required) - The static member classname within tomcat.
- *port* - receiver port of the static member.
- *securePort* - secure receiver port.
- *domain* (required) = cluster domain.
- *UniqueId* (required) = Unique identifier for this static member.
- *host* (required) = hostname or ip address of the static member.
- *nextWadiStaticMember* = Next static member in the member list. This can be left blank or left out completely if there are no more static members.

Clustering of Web-applications

Updating your Deployment Descriptors

Standard and Geronimo specific deployment descriptors must be updated as follows:

- standard deployment descriptor, i.e. web.xml: the Web application must be marked as distributable. In other words, the optional "distributable" element must be defined: `xml <web-app> <distributable/> </web-app>`
- Geronimo deployment descriptor, i.e. geronimo-web.xml: if you are deploying the application to embedded Jetty, then the "clustering-wadi" substitution group must be defined. If you are deploying to embedded Tomcat, then you should use the "tomcat-clustering-wadi" substitution group. These substitution groups are defined by the XSDs `geronimo-clustering-wadi-X.xsd` and `geronimo-tomcat-clustering-wadi-X.xsd` respectively which are included in the *schema* folder of a Geronimo server installation. Both of these elements provide a Web application specific clustering configuration, which overrides the default clustering configuration. This default clustering configuration is defined by the GBean *WADJettyClusteringBuilder* declared by `org.apache.geronimo.configs/jetty6-clustering-builder-wadi/car`.
Here is an example Geronimo deployment descriptor targeted at Jetty embedded: `xml <?xml version="1.0" encoding="UTF-8"?> <web-app xmlns="http://geronimo.apache.org/xml/ns/j2ee/web/jetty-1.2"> <environment> <moduleId> <groupId>yourGroupId</groupId> <artifactId>yourArtifactId</artifactId> <version>YourVersion</version> <type>war</type> </moduleId> </environment> <context-root>/yourPath</context-root> <clustering-wadi/> </web-app>`

If you are using a Tomcat assembly of Geronimo distribution, replace `<clustering-wadi/>` with `<tomcat-clustering-wadi/>` element in the deployment plan.

Jetty Web-application Clustering Configurations

The two following configurations, shipped out-of-the-box with the JEE5 Jetty assemblies, must be installed for clustering to work:

- `org.apache.geronimo.configs/jetty6-clustering-wadi/car`: it defines runtime dependencies and Jetty6 clustering contracts.
- `org.apache.geronimo.configs/jetty6-clustering-builder-wadi/car`: it defines deployment time dependencies along with a *JettyClusteringBuilder* GBean declaring the default clustering configuration.
This configuration must be running when a clustered Web-application is started. If it is not, then the substitution group *clustering-wadi* is not properly recognized and the deployment fails.

Tomcat Web-application Clustering Configurations

Tomcat configurations mirror Jetty's ones except that jetty6-X artifact IDs should be replaced by tomcat6-X.

Clustering of SFSB

Geronimo uses the OpenEJB container for providing EJB services. And Geronimo now has some basic support for SFSB clustering such as state replication between cluster members. Basically the server cluster members maintain membership information using multicast heartbeats and the ejb client maintains a list of servers to change target server based on availability. Each multicast packet contains a single URI that advertises a service, its group, and its location in the form of "cluster1:ejb:ejbd://thehost:4201".

Updating Geronimo EJB deployment plan

The Geronimo-specific deployment plan for an EJB application, which is usually packaged as an EJB JAR file, is called "**openejb-jar.xml**". The **openejb-jar.xml** deployment plan is used to in conjunction with the **ejb-jar.xml** Java EE deployment plan to deploy enterprise applications to the Geronimo application server.

To enable WADI clustering for SFSB, add *openejb-clustering-wadi* into the deployment plan as followed:

```
xml <openejb-jar xmlns="http://openejb.apache.org/xml/ns/openejb-jar-2.2" xmlns:sys="http://geronimo.apache.org/xml/ns/deployment-1.2"> ... <openejb-clustering-wadi/> </openejb-jar>
```

Updating server configuration

The two following configurations, shipped out-of-the-box with the JEE5 assemblies, must be installed for clustering to work:

- `org.apache.geronimo.configs/openejb-clustering-wadi/car`: it defines runtime dependencies and OpenEJB clustering contracts.
- `org.apache.geronimo.configs/openejb-clustering-builder-wadi/car`: it defines deployment time dependencies along with a *OpenEJBClusteringBuilder* GBean declaring the default clustering configuration.
This configuration must be running when a clustered SFSB is started. If it is not, then the substitution group *openejb-clustering-wadi* is not properly recognized and the deployment fails.