

# Application Level Messaging

Each Yellowfin node must have the **ClusterManagement** servlet enabled for the node to become "Cluster Aware". The ClusterManagement servlet is enabled by adding an additional configuration block to the web.xml file on each node.

Application Messaging is performed differently depending on the implementation mode. There are currently three modes available, REPOSITORY, DYNAMIC and LEGACY.

## Multicast Cluster Messaging (DYNAMIC mode)

Yellowfin application messaging is handled by a multicast messaging library called JGroups. Using this method will automatically find other nodes in the cluster sharing the same Yellowfin database.

The default configuration of JGroups uses UDP multicast messages to determine group membership and find new nodes. There may be environments where these types of messages cannot be sent. For example, Amazon does not allow multicast packets on its internal network between nodes. The Multicast Cluster Messaging adapter allows you to pass an XML configuration file to configure JGroups to use other methods for node discovery. This file can be referenced by passing the path to the BroadcastConfiguration servlet parameter within the ClusterManagement servlet.

The following servlet definition needs to be added to the web.xml on each node:

```
<!-- Cluster Management -->
<servlet>
  <servlet-name>ClusterManagement</servlet-name>
  <servlet-class>com.hof.mi.servlet.ClusterManagement</servlet-class>
  <init-param>
    <param-name>ClusterType</param-name>
    <param-value>DYNAMIC</param-value>
  </init-param>
  <init-param>
    <param-name>SerialiseWebserviceSessions</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>ChecksumRows</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>EncryptSessionId</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>EncryptSessionData</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>AutoTaskDelegation</param-name>
    <param-value>true</param-value>
  </init-param>
  <load-on-startup>11</load-on-startup>
</servlet>
```

## Multicast with Repository Discovery (REPOSITORY mode)

Repository Discovery is an implementation of DYNAMIC mode, but with a custom plugin for discovering nodes via the shared Yellowfin Repository. This can be useful for enabling clustering on environments where Multicast packets do not work.

This functionality can also be enabled with DYNAMIC mode with the RepositoryDiscovery servlet parameter set to true.

The following servlet definition needs to be added to the web.xml on each node:

```
<!-- Cluster Management -->
<servlet>
  <servlet-name>ClusterManagement</servlet-name>
  <servlet-class>com.hof.mi.servlet.ClusterManagement</servlet-class>
  <init-param>
    <param-name>ClusterType</param-name>
    <param-value>REPOSITORY</param-value>
  </init-param>
  <init-param>
    <param-name>SerialiseWebserviceSessions</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>ChecksumRows</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>EncryptSessionId</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>EncryptSessionData</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>AutoTaskDelegation</param-name>
    <param-value>true</param-value>
  </init-param>
  <load-on-startup>11</load-on-startup>
</servlet>
```

## Web Service Cluster Messaging (LEGACY mode)

Yellowfin's legacy cluster messaging is handled by AXIS web services. This requires that all nodes be defined at start-up, and that the service end-point, port, user and password be defined in each node's web.xml file. Legacy mode does not allow cluster instances to reside on the same host.

The following servlet definition needs to be added to the web.xml on each node:

```

<!-- Cluster Management -->
<servlet>
  <servlet-name>ClusterManagement</servlet-name>
  <servlet-class>com.hof.mi.servlet.ClusterManagement</servlet-class>
  <init-param>
    <param-name>ServiceUser</param-name>
    <param-value>admin@yellowfin.com.au</param-value>
  </init-param>
  <init-param>
    <param-name>ServicePassword</param-name>
    <param-value>test</param-value>
  </init-param>
  <init-param>
    <param-name>ServiceAddress</param-name>
    <param-value>/services/AdministrationService</param-value>
  </init-param>
  <init-param>
    <param-name>ServicePort</param-name>
    <param-value>80</param-value>
  </init-param>
  <init-param>
    <param-name>ClusterHosts</param-name>
    <param-value>
      192.168.4.184
    </param-value>
  </init-param>
  <init-param>
    <param-name>SerialiseWebserviceSessions</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>ChecksumRows</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>EncryptSessionId</param-name>
    <param-value>true</param-value>
  </init-param>
  <init-param>
    <param-name>EncryptSessionData</param-name>
    <param-value>true</param-value>
  </init-param>
  <load-on-startup>11</load-on-startup>
</servlet>

```

## Web.xml File Parameters

The following properties outline the options in the ClusterManagement servlet definition.

| Property                   | Value                                                                                                                                                                                                                                                                  |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ClusterType                | Either DYNAMIC or LEGACY. DYNAMIC will use multicast messaging and automatically find other nodes in the cluster. LEGACY is the default, and will use web services to communicate with a defined list of cluster nodes.                                                |
| BroadcastC<br>onfiguration | A JGroups configuration file. This allows for a custom Jgroups configuration to be used in environments where multicast networking is not available. This is for DYNAMIC mode only and is optional. By default, JGroups will use the configuration defined in udp.xml. |

|                             |                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ServiceUser                 | User that will validate the web service connection to other nodes. For LEGACY mode only.                                                                                                                                                                                                                                                                                         |
| ServicePassword             | Password for the ServiceUser. For LEGACY mode only.                                                                                                                                                                                                                                                                                                                              |
| ServicePasswordEncrypted    | True/False.<br>Is the contents of the ServicePassword encrypted.                                                                                                                                                                                                                                                                                                                 |
| ServiceAddress              | Address of the Yellowfin web service. For LEGACY mode only.                                                                                                                                                                                                                                                                                                                      |
| ServicePort                 | Port on which Yellowfin is running. For LEGACY mode only.                                                                                                                                                                                                                                                                                                                        |
| ClusterHosts                | This is a comma-separated list of all nodes in the Cluster. These can include IP addresses or hostnames. For LEGACY mode only.                                                                                                                                                                                                                                                   |
| SerialiseWebServiceSessions | True/False.<br>This is required if using Single Sign-On on the Cluster. It can serialise tokens to the database so that the token can be accessed from any node.                                                                                                                                                                                                                 |
| ChecksumRows                | True/False.<br>Security option to check sum the serialised web service session records in the database. This helps prevent modification to the table which could lead to the creation of unauthorised sessions in Yellowfin.                                                                                                                                                     |
| EncryptSessionId            | True/False.<br>Security option to encrypt the serialised web service session id in the database. This helps prevent modification to the table which could lead to the creation of unauthorised sessions in Yellowfin.                                                                                                                                                            |
| EncryptSessionData          | True/False.<br>Security option to encrypt the serialised web service session records in the database. This helps prevent modification to the table which could lead to the creation of unauthorised sessions in Yellowfin.                                                                                                                                                       |
| AutoTaskDelegation          | True/False.<br>This is for DYNAMIC mode only and is optional.<br><br>When enabled, the Cluster will automatically assign a node to perform background tasks. When this is turned on, you do not need to manually configure a node to run background tasks. Yellowfin will turn off System Tasks on a node at start-up if another node is already delegated to perform this task. |
| SessionReplication          | True/False.<br>Set this to true if container level Session Replication is enabled. This will modify the logic used for destroying sessions in a cluster.                                                                                                                                                                                                                         |
| RepositoryDiscovery         | True/False<br>This option is for DYNAMIC mode only. This enables RepositoryDiscovery on builds prior to the REPOSITORY mode being supported. REPOSITORY mode is an alias for DYNAMIC mode with RepositoryDiscovery enabled.                                                                                                                                                      |

## Additional Parameters

Under some circumstances DYNAMIC mode may not work in some environments. This will usually be due to the networking configuration on the server. By default, JGroups will use IPv6 if it is available. IPv4 can be forced, which may allow for it to work correctly. Add the following to the catalina.sh or catalina.bat files:

| File         | Command                                                              |
|--------------|----------------------------------------------------------------------|
| Catalina.sh  | <pre>JAVA_OPTS="\$JAVA_OPTS -Djava.net.preferIPv4Stack=true"</pre>   |
| Catalina.bat | <pre>set JAVA_OPTS=%JAVA_OPTS% -Djava.net.preferIPv4Stack=true</pre> |

When using the default Jgroups configuration (udp.xml), the multicast address and port can also be configured. This may help in environments where cluster nodes are not discovering each other.

| File         | Command                                                                                                |
|--------------|--------------------------------------------------------------------------------------------------------|
| Catalina.sh  | <pre>JAVA_OPTS="\$JAVA_OPTS -Djgroups.udp.mcast_addr=228.0.0.5 -Djgroups.udp.mcast_port=47885"</pre>   |
| Catalina.bat | <pre>set JAVA_OPTS=%JAVA_OPTS% -Djgroups.udp.mcast_addr=228.0.0.5 -Djgroups.udp.mcast_port=47885</pre> |

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**Next topic:** [Background tasks](#)