Tungsten Dashboard for Clustering

Continuent Ltd
This manual documents Tungsten Dashboard 1.0.

Build date: 2021-02-19 (3fbfe655)

Up to date builds of this document: Tungsten Dashboard for Clustering [Online], Tungsten Dashboard for Clustering [PDF]
List of Figures

1.1. Tungsten Dashboard Architecture ................................................................. 6
8.1. Tungsten Dashboard Edit Settings Menu Option .................................................. 27
8.2. Tungsten Dashboard Edit Settings Form .............................................................. 28
8.3. Tungsten Dashboard Auto-Define Menu Option .................................................... 29
8.4. Tungsten Dashboard Auto-Define a Cluster Form .................................................. 30
8.5. Tungsten Dashboard Auto-Define a Cluster Form Completed ..................................... 31
8.6. Tungsten Dashboard Auto-Define a Cluster Form after the Refresh button has been clicked ................................................................. 32
8.7. Define a Cluster Menu Option ............................................................................. 33
8.8. Define a Cluster Form ....................................................................................... 34
8.9. Tungsten Dashboard Delete All Cluster Definitions Menu Option .................................... 35
8.10. Tungsten Dashboard Delete All Cluster Definitions First Confirmation Prompt ............. 36
8.11. Tungsten Dashboard Delete All Cluster Definitions Second Confirmation Prompt .......... 36
8.12. Tungsten Dashboard Delete All Cluster Definitions Success ..................................... 37
12.1. Tungsten Dashboard User Interface .................................................................... 43
12.2. Example Navigation Bar One ........................................................................... 44
12.3. Example Navigation Bar Two ............................................................................ 44
12.4. Example Navigation Bar Three ......................................................................... 44
12.5. Example Composite Parent Row ....................................................................... 45
12.6. Example Composite Member Rows .................................................................... 45
12.7. Example Composite Member Node Rows ............................................................ 47
12.8. Example Standalone Cluster ........................................................................... 49
13.1. Tungsten Dashboard Send Diagnostic Menu Option .............................................. 50
13.2. Tungsten Dashboard Send Diagnostic Form ........................................................ 51
13.3. Tungsten Dashboard Send Diagnostic Success ..................................................... 52
13.4. Tungsten Dashboard Send Diagnostic Failure Due to Missing Keys ......................... 53
C.1. Tungsten Dashboard Self-Update Menu Option ..................................................... 60
C.2. Tungsten Dashboard No Update Available .......................................................... 61
C.3. Tungsten Dashboard Self-Update Form .................................................................. 61
C.4. Tungsten Dashboard Self-Update Success ............................................................ 62
Chapter 1. Tungsten Dashboard Overview

A simple GUI management tool for Tungsten Cluster v5.3.x and above.

Important

Read this entire document before attempting installation.

This application was written using PHP, jQuery and Bootstrap and uses HA Proxy to distribute API requests. The Apache 2 web server was used for the examples in this document.

The Dashboard is usually installed on a standalone web server with HA Proxy installed.

HA Proxy routes API requests to the various database nodes running the manager API listener on port 8090. There is one frontend per cluster. Each backend contains all db nodes for that cluster.

The architecture diagram below displays how things would look when using a 6-node Composite cluster named global, with two member clusters, named east and west.
Figure 1.1. Tungsten Dashboard Architecture
Chapter 2. Tungsten Dashboard Pre-Requisites

Continuent Tungsten Dashboard needs the following prerequisites to function:

- Continuent Tungsten Clustering v5.3.0 and above or v6.0.1 and above only.
- Web server with PHP7 support (sample configs provided for Apache 2.2 and 2.4)
  
  Please note that more recent versions of Linux and Apache use php-fpm to run PHP code.

- Below is a sample command line session on Amazon Linux 2 to get PHP 7.4 installed with all of the needed dependencies:

  ```
  shell> sudo -i
  root shell> amazon-linux-extras enable php7.4
  root shell> yum clean metadata
  root shell> systemctl start php-fpm
  root shell> systemctl enable php-fpm
  ```

- Next, tweak the default Apache PHP configuration, otherwise PHP-FPM gets called for files that don't exist. So, edit the file:

  ```
  shell> sudo -i
  root shell> vi /etc/httpd/conf.d/php.conf
  ```

  - Change the SetHandler around line 27 from OLD to NEW:

  ```
  OLD -
  <FilesMatch \.php$>
  SetHandler "proxy:unix:/run/php-fpm/www.sock|fcgi://localhost"
  </FilesMatch>
  
  NEW -
  <FilesMatch \.php$>
  <If "-f %{SCRIPT_FILENAME}"
  SetHandler "proxy:unix:/run/php-fpm/www.sock|fcgi://localhost"
  </If>
  </FilesMatch>
  ```

- Then check and restart Apache:

  ```
  shell> sudo apachectl configtest
  shell> sudo systemctl restart httpd
  ```

- PHP Curl Support - install `php-common` or `php-curl` and restart your web server

- HA Proxy - [http://www.haproxy.org](http://www.haproxy.org)

- Make sure to open ALL of the appropriate firewall ports to ensure access.

  - The default architecture would require TCP port 8090 open between the web server running the Dashboard and all cluster nodes in all clusters that are to be administered by the GUI application.
  
  - By default, port 80 will need to be open from the client browser to the web server running the Tingsten Dashboard. If HTTPS has been implemented, TCP 443 must be opened in addition to port 80.
Chapter 3. Tungsten Dashboard Security Limitations

Continuent Tungsten Dashboard has the following security limitations:

Warning

THERE IS NO API SECURITY YET - If you enable the API on the Manager, anyone may connect to it. Use your firewall to block port 8090 from non-essential hosts.

Warning

SSL (https) is not yet supported on the Manager API endpoints.

Warning

Please use Apache Basic Auth to lock down access to the Tungsten Dashboard GUI.

Warning

SSL (https) configuration for the Tungsten Dashboard is possible, but is beyond the scope of this document.

Warning

Locking only works on a single web server host, so if you have installed the Tungsten Dashboard on more than one host, the lock is not shared and is therefore ineffective.
Chapter 4. Configure the Tungsten Cluster Manager API

Add the following to `/etc/tungsten/tungsten.ini` [in [Tungsten Clustering (for MySQL) 6.1 Manual]] under the `[defaults]` section:

```
mgr-api-port=8090
mgr-api=true
mgr-api-address=0.0.0.0
mgr-api-full-access=true
```

**Warning**

Either SHUN the individual nodes one at a time and WELCOME each one after running the update, or set policy to MAINTENANCE via `cctrl` and update all nodes, then set the policy back to AUTOMATIC when all nodes have been completed.

Inform the running manager of the changed configuration:

```
shell> tpm update
```

**Important**

You may need to restart the manager.

Verify that the port is listening:

```
shell> sudo netstat -tan | grep 8090
```
Chapter 5. Test Connectivity to the Tungsten Manager API Directly

Test connectivity to the Tungsten Manager API directly using curl:

```shell
curl -s http://db1:8099/manager/status/east/
curl -s http://db4:8099/manager/status/west/
curl -s -X POST http://db4:8099/manager/control/west/heartbeat
```
Chapter 6. Install the Tungsten Dashboard

Important

Please change the example values below to match your specific environment.

For example, create a new user called `tungsten`, group `tungsten`, homedir `/home/tungsten`:

```
shell> sudo useradd -m -d /home/tungsten -s /bin/bash -c "Tungsten Dashboard" -U tungsten
```

Note: Later on you will need to add the `apache` user to the `tungsten` group and restart apache.

Now create the Tungsten Dashboard web root directory and all needed subdirectories:

```
shell> sudo mkdir /volumes/data/www/tungsten
shell> sudo chown -R tungsten: /volumes/data/www/tungsten

shell> sudo su - tungsten
shell> cd /volumes/data/www/tungsten
shell> mkdir etc logs
shell> chmod 2770 logs
shell> chmod 2750 etc
```

Still as user `tungsten`, download the software using the temporary URL provided by Continuent, or login to the web download portal to obtain the software [https://www.continuent.com/downloads/](https://www.continuent.com/downloads/), then copy to the web root directory for use in the next step:

```
shell> cd
shell> wget -O tungsten-dashboard-1.0.0-123.tar.gz 'TEMP_URL_PROVIDED_BY_CONTINUENT'
shell> tar xvzf tungsten-dashboard-1.0.0-123.tar.gz
shell> cd tungsten-dashboard-1.0.0-123
shell> rsync -a html/ /volumes/data/www/tungsten/html/
shell> chmod 2775 /volumes/data/www/tungsten/html
shell> mkdir /volumes/data/www/tungsten/html/locks
shell> chmod 2775 /volumes/data/www/tungsten/html/locks
```
Chapter 7. Configure the Apache 2 Web Server

Important

Please change the example values below to match your specific environment.

Add the apache user to the tungsten group:

```shell
sudo usermod -a -G tungsten apache
```

Create the apache configuration file for the web service:

```shell
sudo vim /etc/httpd/conf.d/z01-tungsten-dashboard.conf
```

For Apache version 2.2:

```xml
<VirtualHost *:80>
  ServerName dashboard.yourdomain.com
  DocumentRoot /volumes/data/www/tungsten/html
  DirectoryIndex index.php
  ServerAdmin dashboard.apache.admin@yourdomain.com
  Header set Access-Control-Allow-Origin *
  ErrorLog "| /usr/sbin/rotatelogs /volumes/data/www/tungsten/logs/errors.log 86400"
  CustomLog "| /usr/sbin/rotatelogs /volumes/data/www/tungsten/logs/access.log 86400" combined
  <Directory "/volumes/data/www/tungsten/html">
    AllowOverride All
    Options +FollowSymLinks +ExecCGI -Indexes
    Order allow,deny
    Allow from all
    #AuthType Basic
    #AuthName "Tungsten Dashboard - RESTRICTED"
    #AuthUserFile /volumes/data/www/tungsten/etc/.htpasswd
    #Require valid-user
  </Directory>
</VirtualHost>
```

For Apache version 2.4:

```xml
<VirtualHost *:80>
  ServerName dashboard.yourdomain.com
  DocumentRoot /volumes/data/www/tungsten/html
  DirectoryIndex index.php
  ServerAdmin dashboard.apache.admin@yourdomain.com
  ErrorLog "| /usr/sbin/rotatelogs /volumes/data/www/tungsten/logs/errors.log 86400"
  CustomLog "| /usr/sbin/rotatelogs /volumes/data/www/tungsten/logs/access.log 86400" combined
  <Directory "/volumes/data/www/tungsten/html">
    AllowOverride All
    Options +FollowSymLinks +ExecCGI -Indexes
    Order allow,deny
    Allow from all
    Require all granted
    #RequireAll
    #AuthType Basic
    #AuthName "Tungsten Dashboard - RESTRICTED"
    #AuthUserFile /volumes/data/www/tungsten/etc/.htpasswd
    #Require valid-user
    #</RequireAll>
  </Directory>
</VirtualHost>
```

Check the configuration and restart the web server:

```shell
sudo apachectl configtest
sudo apachectl restart
```

To use Apache 2.2 Basic Authentication, uncomment the four commented-out lines then run:
Configure the Apache 2 Web Server

To use Apache 2.4 Basic Authentication, uncomment the `RequireAll` section above, comment out the line "Require all granted" then run:

```
shell> htpasswd -c /volumes/data/www/tungsten/etc/.htpasswd {desiredlogin}
shell> sudo apachectl configtest
shell> sudo apachectl graceful
```
Chapter 8. Configure the Tungsten Dashboard

8.1. Tungsten Dashboard Initial Configuration Example

Replace the service names and ports in $jsonConfig to match your HA Proxy setup:

```
shell> sudo su - tungsten
shell> cd /volumes/data/www/tungsten/html/
shell> mv config.php.sample config.php
shell> vim config.php
```

8.2. Tungsten Dashboard Configuration Best Practices

Important

*** There is a one-to-one relationship between Tungsten services and haproxy ports. See examples following this section. ***

- Host and port are required for all clusters.
- A cluster is marked as a composite parent if it has the “children” array, even if the array is empty.
- A cluster is marked as a composite child if it has the “memberOf” key defined.
- All Composite member (child) clusters require their own definitions so we know about the host and port for each.
- All cluster service names MUST be unique. If you have clusters in different environments that have the same names, they will conflict.
- Added in v1.0.7: To solve the above limitation that all cluster service names must be unique, add the sub-key `actualName` pointing to the “real” name of the service, and change the top-level cluster service name to some alias that you understand.

For example, you have two clusters named “east”, one in prod and the other in staging:

```
"clusters": {
  "east_prod": {
    "host": "localhost",
    "port": "8091",
    "actualName": "east"
  },
  "east_staging": {
    "host": "localhost",
    "port": "8092",
    "actualName": "east"
  }
},
```

Important

When using composite clusters, the `children` key (for the composite service) and the `memberOf` key (for the member cluster services) must point to the “alias” names, not the `actualName` value. For example:

```
"clusters": {
  "global_prod": {
    "host": "localhost",
    "port": "8091",
    "children": ["east_prod","west_prod"],
    "actualName": "global"
  },
  "east_prod": {
    "host": "localhost",
    "port": "8092",
    "memberOf": "global_prod",
    "actualName": "east"
  },
  "west_prod": {
    "host": "localhost",
    "port": "8092",
    "memberOf": "global_prod",
    "actualName": "west"
  }
},
```
Configure the Tungsten Dashboard

- Please note that the `host: localhost` should remain localhost because this tells the app to call the haproxy server on the GUI server node, which will then handle routing to the appropriate manager/database node.
- You may add your own custom menu options to the tools menu by editing the menus->tools section in the json configuration.
- By default the Auto-refresh feature is disabled (i.e. set to zero). You may enable `autoRefreshDelay` by setting it to one of the Auto-Refresh time interval values.
- By default, the list of Auto-Refresh time intervals is defined as 5, 10, 30, 60, 120 or 300 seconds. You may change that by using the `autoRefreshList` setting, i.e.:
  
  ```json
  "autoRefreshList": [3,5,10,30,60,120,300,600]
  ```

  **Important**

  PLEASE NOTE: `autoRefreshList` values less than 3 seconds are strongly discouraged.

- Under normal circumstances, you should not need to get a lock, since all operations automatically attempt to obtain a lock for efficiency purposes. This has the side-effect of leaving your session in a locked state.

  There are two settings that help address this situation, `autoUnlockHeartbeat` and `autoUnlockAll`.

  You may set `autoUnlockHeartbeat` to 1 to automatically unlock after issuing a heartbeat command.

  You may set `autoUnlockAll` to 1 to automatically unlock after issuing any command.

- You may set `dashboardMaintenanceScreen` to 1 to display a Maintenance-In-Progress message.

  The default Tab Badge update rate is 30 seconds. You may disable it by setting `tabUpdateRate` to zero (0). You may change the refresh rate in seconds by specifying a non-zero value.

  ```json
  "tabUpdateRate": 60
  ```

- Use `lockBaseDir` to change the location of the temporary lock files. The default `lockBaseDir` is `{WEBROOT}`, making the default lock directory `{WEBROOT}/locks/`, i.e. a `lockBaseDir` of `/tmp` (in [Tungsten Clustering (for MySQL) 6.1 Manual]) will yield a lock directory of `/tmp/locks`.

  ```json
  "lockBaseDir": "/tmp"
  ```

- Added in v1.0.7: Use `msgFadeOutTimer` to automatically close messages after the defined timeout in seconds. The default is 60 seconds.

  ```json
  "msgFadeOutTimer": 60
  ```

- Added in v1.0.8: Set `disableConfigDisplay` to 1 to prevent the menu choice for Tools -> Display Configuration from appearing.

  ```json
  "disableConfigDisplay": 1
  ```

- Added in v1.0.8: Set `disableToolTips` to 1 to prevent the formatted hover-over help tooltips from appearing.

  ```json
  "disableToolTips": 1
  ```

- Added in v1.0.8: Use `windowTitle` to change the browser window title from the default of “Tungsten Dashboard”.

  ```json
  "windowTitle": "Prod Env | Tungsten Dashboard"
  ```

- Added in v1.0.8: The `sortByConfigOrderNotAlpha` controls the Cluster View sort. By default the list of cluster services is sorted alphabetically. Set `sortByConfigOrderNotAlpha` to 1 for the cluster services to be displayed in the order listed in the config.php file.

  ```json
  "sortByConfigOrderNotAlpha": 1
  ```

- Added in v1.0.8: The `enableRBAC` setting controls the Role-Based Access Control (RBAC) feature. Disabled by default, set it to one and populate the list of read-write users via the sibling `administrators` setting.

  There are two roles:

  - Administrator - Full access
  - Operator - Read-only access

  When `enableRBAC` is set to one, all users not listed in the `administrators` setting are read-only Operators.

  When enabled, the user’s current role will be displayed in the footer. Refresh the page to activate any changes to `config.php`.

  This feature requires Basic Auth to be properly configured on the Web server.

  ```json
  "enableRBAC": 1
  ```
8.3. Tungsten Dashboard Configuration Settings Reference

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Default Type</th>
<th>Description</th>
<th>Recommended Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>administrators</td>
<td>ARRAY OF STRINGS</td>
<td>You may set administrators to a list of usernames matching those used by Basic Auth (i.e. via htpasswd). Any users not listed are considered to be read-only Operators. Requires that the enableRBAC setting be enabled [set to 1] and that Basic Auth in the web server has been properly configured. Added in v1.0.8.</td>
<td>[ &quot;user1&quot;, &quot;user2&quot;, &quot;user3&quot; ]</td>
</tr>
<tr>
<td>autoLockAll</td>
<td>BOOLEAN</td>
<td>Automatically lock the Dashboard during ANY non-read-only action to prevent other users from performing any non-read-only actions on this cluster.</td>
<td>Y</td>
</tr>
<tr>
<td>autoLockHeartbeat</td>
<td>BOOLEAN</td>
<td>Automatically lock the Dashboard during heartbeat actions to prevent other users from performing any</td>
<td>Y</td>
</tr>
</tbody>
</table>

Note: For autoLockAll, if `enableRBAC=1`, otherwise `1` otherwise, `0`.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Recommended Value</th>
<th>Via GUI</th>
<th>Default Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>autoUnLockAll</td>
<td>Controls the Auto-Refresh feature. By default the feature is disabled (i.e. set to zero seconds). To have the Auto-Refresh feature enabled upon initial page load, set autoRefreshDelay to one of the Auto-Refresh time interval values [see autoRefreshList].</td>
<td>1</td>
<td>Y</td>
<td>BOOLEAN</td>
</tr>
<tr>
<td>autoRefreshDelay</td>
<td>The list of time intervals in seconds shown on the Auto-Refresh dropdown menu. autoRefreshList values less than 3 seconds are strongly discouraged.</td>
<td>[5, 7, 10, 15, 20, 30, 60]</td>
<td>N</td>
<td>IN-TE-GER</td>
</tr>
<tr>
<td>autoRefreshList</td>
<td></td>
<td>[5, 7, 10, 15, 20, 30, 60]</td>
<td>N</td>
<td>IN-TE-GER</td>
</tr>
</tbody>
</table>
**Configure the Tungsten Dashboard**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Default Value</th>
<th>Recommended Value</th>
<th>Via</th>
<th>GUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>autoUnlock</td>
<td>session in a locked state. You may set autoUnlockAll to 1 to automatically unlock the Dashboard after issuing any command.</td>
<td>0</td>
<td>1</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>heartbeat</td>
<td>You may set autoUnlockHeartbeat to 1 to automatically unlock the Dashboard after issuing a heartbeat command.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>customerName</td>
<td>use customerName to pre-populate the Tungsten Dashboard diagnostic upload form customer name field. Added in v1.0.9</td>
<td>None</td>
<td>{Your customer name}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dashboardMain-</td>
<td>You may set dashboardMainenanceScreen to 1 to display a &quot;Maintenance-In-Progress&quot; message.</td>
<td>0</td>
<td>1</td>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Notes:**

- **autoUnlock**: Normal circumstances, you should not need to get a lock, since all operations automatically attempt to obtain a lock for efficiency purposes. This has the side-effect of leaving your session in a locked state. You may set autoUnlockHeartbeat to 1 to automatically unlock the Dashboard after issuing a heartbeat command.

- **customerName**: Use customerName to pre-populate the Tungsten Dashboard diagnostic upload form customer name field. Added in v1.0.9.

- **dashboardMainenanceScreen**: You may set dashboardMainenanceScreen to 1 to display a "Maintenance-In-Progress" message.
<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Type</th>
<th>Description</th>
<th>Recommended Value</th>
<th>Via GUI configdisplay to 1 to prevent the menu choice for Tools -&gt; Display Configuration from appearing. Added in v1.0.8</th>
<th>0, Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>disableConfigDisplay</td>
<td>BOOLEAN</td>
<td>if you do not wish read-only access to the configuration via the browser.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>disableSettingsEdit</td>
<td>BOOLEAN</td>
<td>disable the editing of settings in the browser by changing the value of disableSettingsEdit to 1 in the config.php file, in the &quot;settings&quot;: () stanza. Added in v1.0.9</td>
<td>0, N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>disableTooltips</td>
<td>BOOLEAN</td>
<td>if you do not wish read-only access to the configuration via the browser.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Note:**

- The values 0 and 1 represent boolean states, where 0 is false (disabled) and 1 is true (enabled).
- Configuration changes may require restarting the Tungsten Dashboard for the new settings to take effect.
- For detailed instructions on enabling or disabling settings, refer to the documentation or user manual.
<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AccessKey</td>
<td>STRING</td>
<td>Use AccessKey to enable the Tungsten Dashboard self-update feature. Requires downloadSecretKey.</td>
</tr>
<tr>
<td>SecretKey</td>
<td>STRING</td>
<td>Use SecretKey to enable the Tungsten Dashboard self-update feature. Requires downloadAccessKey.</td>
</tr>
<tr>
<td>enableAutoConfiguration</td>
<td>BOOLEAN</td>
<td>Use enableAutoConfiguration to enable the Tungsten Dashboard auto-configuration feature. Attempts to connect to the Manager on localhost to determine the cluster to display. Related options are managerPort and useHAProxy. Added in v1.0.9</td>
</tr>
<tr>
<td>enableDebug</td>
<td>BOOLEAN</td>
<td>Set enableDebug to 1 to get additional logging information and use the debug software versions when checking</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>enableExpertMode</td>
<td>0</td>
<td>Enables Expert Mode, disables both confirmation prompts when Deleting All Definitions. Added in v1.0.9</td>
</tr>
<tr>
<td>enableRBAC</td>
<td>1</td>
<td>Setting enableRBAC to 1 enables the use of Role-Based Access Control. Requires that the administrators setting be populated and that Basic Auth in the web server has been enabled or no actions will be allowed. Added in v1.0.8</td>
</tr>
<tr>
<td>enableUpdates</td>
<td>1</td>
<td>Setting enableUpdates to 0 in the config.php file, in the &quot;settings&quot;: {} stanza, to disable the Dashboard self-update feature. When enableUpdates is set to 1 (enabled, default), two other values are needed, downloadAccessKey and downloadSecretKey.</td>
</tr>
</tbody>
</table>
### Configure the Tungsten Dashboard

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Default Value</th>
<th>Recommended Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>jumpToTopOnMsg</td>
<td>Dashboard places all messages at the top of the center scroll window (for now). If you have scrolled down to view information below the fold, and execute a command, it is possible the message will be obscured. When <code>jumpToTopOnMsg</code> is set to the default of <code>1</code>, the center portal will auto-scroll to the top so the message is visible. Set <code>jumpToTopOnMsg</code> to <code>0</code> to disable this behavior and leave the window where it is after a command is selected.</td>
<td>0</td>
<td>Y</td>
</tr>
<tr>
<td>lockBaseDir</td>
<td>Use <code>lockBaseDir</code> to change the location of the temporary lock files. The default <code>lockBaseDir</code> is <code>{WEB-BROOT}</code>, making the default lock directory <code>{WEB-BROOT}/locks/</code>, [i.e. <code>lockBaseDir</code> of <code>/tmp</code> in <code>Tungsten</code>].</td>
<td><code>{WEB-BROOT}</code></td>
<td><code>{WEB-BROOT}</code></td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
<td>Default Value</td>
<td>Recommended Value</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>---------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Tungsten Clustering (for MySQL)</td>
<td>will yield a lock directory of /tmp/locks</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>Variable Name</td>
<td>Default Value</td>
<td>Recommended Value</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------</td>
<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>sortByConfigOrder</td>
<td>1</td>
<td>Y</td>
<td>The sortByConfigOrderNoAlpha controls the Cluster View sort. By default the list of cluster services is sorted alphabetically. Set sortByConfigOrderNoAlpha to 1 for the cluster services to be displayed in the order listed in the config.php file. Added in v1.0.8.</td>
</tr>
<tr>
<td>startExpanded</td>
<td>1</td>
<td>Y</td>
<td>Expanded to control the initial display of the cluster nodes. The default of 0 hides the cluster nodes. Set this option to 1 for all nodes to be visible upon initial load.</td>
</tr>
<tr>
<td>tabUpdateRate</td>
<td>30</td>
<td>Y</td>
<td>The default Tab Badge Update rate is 30 seconds. The Tab Bar and associated badges are located in the navigation bar two. You may disable it by setting tabUpdateRate to zero (0). You may change the refresh rate in seconds by specify-</td>
</tr>
</tbody>
</table>
Configure the Tungsten Dashboard

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Description</th>
<th>Recommended Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>tmpDir</td>
<td>STRING</td>
<td>Use tmpDir to specify where downloaded software packages are saved to by the Tungsten Dashboard self-update feature. Added in v1.0.9</td>
<td>/tmp</td>
</tr>
<tr>
<td>uploadAccessKey</td>
<td>STRING</td>
<td>Use uploadAccessKey to enable the Tungsten Dashboard self-diagnostic feature. Requires uploadSecretKey. Added in v1.0.9</td>
<td>Same as default</td>
</tr>
<tr>
<td>uploadSecretKey</td>
<td>STRING</td>
<td>Use uploadSecretKey to enable the Tungsten Dashboard self-diagnostic feature. Requires uploadAccessKey. Added in v1.0.9</td>
<td>Same as default</td>
</tr>
<tr>
<td>useHAProxy</td>
<td>BOOLEAN</td>
<td>The useHAProxy value is used to determine how to calculate ports when performing auto-configuration and auto-define. Set the value to 1 to determine the manager port number automatically during various operations based on</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note:**
- tmpDir should contain a non-zero value.
- uploadAccessKey and uploadSecretKey are required together.
- useHAProxy is a boolean value.
Configure the Tungsten Dashboard Configuration Settings GUI Panel

Configure the Dashboard Settings via the Browser

Version 1.0.9. This feature was first introduced in Tungsten Dashboard version 1.0.9-61
Figure 8.1. Tungsten Dashboard Edit Settings Menu Option
Configure the Tungsten Dashboard

Figure 8.2. Tungsten Dashboard Edit Settings Form

- Update the desired settings then click the “Save” button to update the values on disk.
- Values are stored as single JSON text files in the `{WEBROOT}/settings.d/` subdirectory.
- You can manually edit the files in the `{WEBROOT}/settings.d/` subdirectory. The page will reflect the changes on disk when refreshed.

**Settings Order of Precedence:**

1. Files in `settings.d`
2. Settings in `config.php`
3. Coded defaults

- The Edit Settings panel is also available by clicking the appropriate icon in the top tool bar.
Configure the Tungsten Dashboard

8.5. Define a Cluster

Version 1.0.9. This feature was first introduced in Tungsten Dashboard version 1.0.9-61

Prior to version 1.0.9, all cluster definitions had to be located in the `config.php` file in the `clusters` stanza.

You may now configure cluster definitions by hand or via the GUI.

**Important**

Using the GUI to define clusters is the recommended best practice as of version 1.0.9

A new configuration path `{WEBROOT}/conf.d` can be populated with plain text files in JSON format, one per cluster.

Entries which functioned properly in the `config.php` file will work in the `{WEBROOT}/conf.d` files.

Both the Auto-Define Cluster and Define Cluster GUI workflows create files in the `{WEBROOT}/conf.d` subdirectory.

8.5.1. Auto-Define a Cluster

Automatically Create the Configuration Definition Files for an Existing Cluster

Version 1.0.9. This feature was first introduced in Tungsten Dashboard version 1.0.9-61

![Figure 8.3. Tungsten Dashboard Auto-Define Menu Option](image)
Configure the Tungsten Dashboard

Figure 8.4. Tungsten Dashboard Auto-Define a Cluster Form

- Enter the appropriate host and port along with an optional prefix/suffix alias string, then click the Proceed button to generate one or more cluster definitions.

- When you enter the “Service Name Alias Prefix or Suffix”, this value gets added to the beginning or end of the actual service name found. This is useful if you have more than one cluster defined with the same service name. The Dashboard requires a unique identifier in that case. The addition of a prefix_ or _suffix is usually enough to uniquely identify that cluster.
Once the auto-define finds and configures a cluster, the results will be displayed in green and the Proceed control button will be disabled.

To easily add another cluster without leaving the form, simply click on the Refresh button to prime the form for another run.
Figure 8.6. Tungsten Dashboard Auto-Define a Cluster Form after the Refresh button has been clicked

- After clicking the refresh button, the previously-created cluster will be moved into the activity history and the port will be advanced to the next available port.
- Edit the fields as needed, then click the enabled Proceed button again.
- Click Reload to finish and see the resulting clusters!

8.5.2. Define a Cluster via GUI

Version 1.0.9. This feature was first introduced in Tungsten Dashboard version 1.0.9-61
You may choose to define a cluster manually.

This form will allow you to create cluster definitions in the \( \text{WEBROOT}/\text{conf.d/} \) subdirectory, one JSON text file per cluster defined.

You must complete this form once for each cluster to add if you are not using auto-define. If you have a composite cluster with two member clusters, that would imply a total of three definition files, one for the parent composite cluster, and one for each of the member clusters.
Configure the Tungsten Dashboard

8.5.3. Delete All Cluster Definitions

Version 1.0.9. This feature was first introduced in Tungsten Dashboard version 1.0.9-61
There are two confirmation prompts before the definitions are removed.

Once removed, this action cannot be undone. You will have to re-create the definitions.

Only definitions that are stored as single JSON files in the `{WEBROOT}/conf.d/` subdirectory will be deleted. Clusters defined in the `config.php` file will not be removed.
Configure the Tungsten Dashboard

Figure 8.10. Tungsten Dashboard Delete All Cluster Definitions First Confirmation Prompt

Figure 8.11. Tungsten Dashboard Delete All Cluster Definitions Second Confirmation Prompt
8.5.4. Cluster Definition Configuration Examples

This is a sample standalone cluster configuration from `config.php`:

```php
$jsonConfig = <<<EOJ
{  "clusters": {   "north": {    "host":"localhost",    "port":8093"   }  },  "menus": {  "tools": {    "Add your links here":"http://docs.continuent.com/tungsten-dashboard-1.0/tungsten-dashboard-configure-dashboard.html"  }  },  "settings": {  "dashboardMaintenanceScreen":0,  "autoRefreshList": [5,10,30,60,120,300]  } }
EOJ;
```

This is a sample composite cluster configuration from `config.php` (either active/passive or active/active):

```php
$jsonConfig = <<<EOJ
{  "clusters": {   "global": {    "host":"localhost",    "port":8091,    "children": [ "west","east" ]   },   "east": {    "host":"localhost",    "port":8092",    "memberOf":"global"   },   "west": {    "host":"localhost",    "port":8093",    "memberOf":"global"   }  },  "menus": {  "tools": {    "Add your links here":"http://docs.continuent.com/tungsten-dashboard-1.0/tungsten-dashboard-configure-dashboard.html"  }  },  "settings": {  "dashboardMaintenanceScreen":0,
```

---

37
Configure the Tungsten Dashboard

"autoRefreshList": [5, 10, 30, 60, 120, 300]
}
Chapter 9. Install and Configure HA Proxy

The Tungsten Cluster Manager listens on port 8090 for API calls, so we configure the HA Proxy listener ports to not conflict with that.

There must be one frontend per cluster, so the first one starts with port 8091.

In the example below, we assign frontend port 8091 to the composite global, frontend port 8092 to the cluster east and frontend port 8093 to the cluster west.

It is imperative that there be one backend per cluster containing all nodes in that cluster. In the case of a composite, the backend should contain all nodes from all member clusters.

In the below example, backend east contains member nodes db1-3, backend west contains nodes db4-6 and backend global contains nodes db1-6.

NOTE: See haproxy.cfg in the examples directory for a more complete sample config to be used locally on a web server or jump host.

Install and prepare the HA Proxy install:

```
shell> sudo -i
shell> yum install haproxy
shell> cd /etc/haproxy/
shell> cp haproxy.cfg haproxy.cfg.orig
```

Edit `/etc/haproxy/haproxy.cfg` and define the global options, defaults, frontend listeners, backend services and associated hosts:

```
shell> vi /etc/haproxy/haproxy.cfg

global
  chroot /var/lib/haproxy
  pidfile /var/run/haproxy.pid
  maxconn 4000
  user haproxy
  group haproxy
daemon

  # turn on stats unix socket
  stats socket /var/lib/haproxy/stats

defaults
  node tcp
  log global
  option tcplog
  option dontlognull
  option redispatch
  retries 3
  timeout queue 1m
  timeout connect 10s
  timeout client 1m
  timeout server 1m
  timeout check 10s
  maxconn 3000

frontend global
  bind *:8091
  default_backend global

frontend east
  bind *:8092
  default_backend east

frontend west
  bind *:8093
  default_backend west

backend global
  balance roundrobin
  server db1 db1.yourdomain.com:8090 check
  server db2 db2.yourdomain.com:8090 check
  server db3 db3.yourdomain.com:8090 check
  server db4 db4.yourdomain.com:8090 check
  server db5 db5.yourdomain.com:8090 check
  server db6 db6.yourdomain.com:8090 check

backend east
  balance roundrobin
  server db1 db1.yourdomain.com:8090 check
  server db2 db2.yourdomain.com:8090 check
```

39
Install and Configure HA Proxy

```
server db3 db3.yourdomain.com:8090 check
backend west
    balance roundrobin
    server db4 db4.yourdomain.com:8090 check
    server db5 db5.yourdomain.com:8090 check
    server db6 db6.yourdomain.com:8090 check
```

Configure start at boot:

```
shell> chkconfig haproxy on
```

Restart the HA Proxy service:

```
shell> service haproxy restart
```
Chapter 10. Test Connectivity to the Tungsten Manager API via HAProxy

Test connectivity to the Tungsten Manager API via HAProxy using curl:

```
shell> curl -s http://localhost:8091/manager/status/global/
shell> curl -s http://localhost:8092/manager/status/east/
shell> curl -s http://localhost:8093/manager/status/west/
shell> curl -s -X POST http://localhost:8093/manager/control/west/heartbeat
```
Chapter 11. Access the Tungsten Dashboard GUI via a browser

Access the Tungsten Dashboard GUI via a browser:

Browser URL: http://dashboard.yourdomain.com/
Chapter 12. Tungsten Dashboard User Interface

This section describes all of the features and functionality available in our browser-based Graphical User Interface.

12.1. Tungsten Dashboard User Interface Overview

Below is a sample of how the Dashboard would look for a Composite cluster called `world` with two 3-node member clusters, called `east` and `west`:

Figure 12.1. Tungsten Dashboard User Interface

1. Navigation Bar One
2. Navigation Bar Two
3. Navigation Bar Three
4. Example Composite cluster parent `world` summary row with controls
5. Example Composite cluster member `east` summary row with controls
6. Example cluster relay node `db1` summary row with controls
7. Example cluster Replica node `db3` summary row with controls
8. Example Composite cluster member `west` summary row with controls
9. Example cluster Primary node `db4` summary row with controls
10. Example cluster witness node `db6` summary row with controls
11. Footer with copyright, back-to-top link, visit count and session id
12.2. Dashboard Navigation Bar One

Nav Bar One is the first horizontal bar across the top of the window.

Figure 12.2. Example Navigation Bar One

1. Logo and site title - click either to return to the home page (full page load)
2. Clusters menu - All cluster configured in the config.php file will be displayed in a hierarchical view. Click on any one to limit the view to that cluster. If you select a Composite cluster, the parent and all member clusters will show.
3. Tools menu - various links to outside resources. Custom links may be added here via the config.php file in the web root directory.
4. Help feature - click to reveal helpful information.

12.3. Dashboard Navigation Bar Two

Nav Bar Two is the second horizontal bar across the top of the window.

Figure 12.3. Example Navigation Bar Two

The badges for “Policy Not Auto” and “Not Ready” tabs are auto-updated via AJAX every 30 seconds independently of the Auto-Refresh setting on Navigation Bar Two.

1. All Clusters Tab - click to see all available clusters, same as clicking logo and site title (full page load)
2. Policy Not Auto Tab - click to see all only those clusters where the policy is set to other than Automatic
3. Not Ready Tab - click to see only clusters that are not in the Ready state
4. Filtering feature - enter a value to search for in the cluster name. The search is case in-sensitive and has automatic wildcards on both sides of the string. Click on the Clear button to empty out the filter field.

12.4. Dashboard Navigation Bar Three

Nav Bar Three is the third horizontal bar across the top of the window.

Figure 12.4. Example Navigation Bar Three

1. Content title - shows current view or filter in use
2. Auto-refresh feature - select a refresh rate of 0 (off), 5, 10, 30, 60, 120 or 300 seconds. This will enable AJAX-based reloads of the clusters in the content section without reloading the entire page. Look for the spinner in the refresh button per cluster when the refresh is triggered.
3. Reload button - same as clicking the top logo (full page load)
4. Hide All Details button - each database node is expandable to display all available details. This button closes them all.
5. Show All Details button - each database node is expandable to display all available details. This button opens them all.
6. Collapse All button - each Composite cluster is expandable to display all available node rows. This button closes them all.
7. Expand All button - each Composite cluster is expandable to display all available node rows. This button opens them all.
8. Clear Messages button - dismiss all messages that are showing at the top of the screen.
12.5. Dashboard Composite Parent Row

A composite Parent row contains controls for the entire Composite cluster.

Figure 12.5. Example Composite Parent Row

1. Cluster type composite vertical tag, resource icon and parent cluster name.
2. Composite cluster status. The color will change based on the status. Status will be one of: Ready, Warning, or Error.
3. Cluster Policy. One of: Automatic, Maintenance or Mixed. There is a state-sensitive dropdown menu to allow the Policy to be changed.
4. Cluster type - one of: Standalone, Composite Active/Active (CAA) or Composite Active/Passive (CAP). Standalone has no composite child clusters. This field is a duplicate of the vertical tag at the start of field [1], above.
5. Connections - display the total number of active connections from all Connectors to all nodes in this specific cluster. If you hover over the info icon, you can see the full breakdown by node.
6. Composite actions dropdown menu - these are the same commands available when using cctrl -multi followed by use {composite_service_name_here}, i.e.:

   ```bash
   shell> cctrl -multi
   [LOGICAL] / > use world
   [LOGICAL] /world > {your_selected_command_here}
   ```
   - Heartbeat (actually cluster heartbeat [in [Tungsten Clustering [for MySQL] 6.1 Manual]])
   - Recover
   - Switch - only available for CMS clusters
   - Failover - only available for CMS clusters
7. Locking status text and icon with dropdown menu to allow lock control.

   **Important**

   Under normal circumstances, you should not need to get a lock, since all operations automatically attempt to obtain a lock for efficiency purposes.

8. Refresh button - triggers an AJAX refresh of the parent cluster and all member clusters including all node rows. (no page load)
9. Collapse all in Composite cluster - hide node rows for all member clusters in this Composite.

12.6. Dashboard Composite Member Rows

A composite member row contains controls for all nodes in the member cluster.

Member clusters may have either the Active or Passive role.

There will be only one Active member cluster and any number of Passive member clusters.

Figure 12.6. Example Composite Member Rows

1. Cluster type vertical tag [Primary or Replica], member cluster right-arrow indicator and cluster resource icon
2. Cluster parent service name followed by the cluster service name.
3. Composite member cluster status. The color will change based on the status. Status will be one of: Ready, Warning, or Error
4. Cluster Policy. One of: Automatic, Maintenance or Mixed. There is a state-sensitive dropdown menu to allow the Policy to be changed.
5. Cluster type - one of: Standalone, Composite, Active or Passive. Active and Passive both imply Composite membership. Standalone has no composite membership. This field is a duplicate of the vertical tag at the start of field [1] above.

6. Connections - display the total number of active connections from all Connectors to all nodes in the entire Composite cluster. If you hover over the info icon, you can see the full breakdown by node.

7. Coordinator - display the host which currently has the coordinator role for the member cluster. Every cluster designates one of the Tungsten Managers in the cluster as the coordinator and it is this Manager that will be responsible for taking action, if action is required, to recover the cluster's database resources to the most highly available state possible.

8. Cluster actions dropdown menu - there are three distinct types of choices in this dropdown menu
   - UI-Specific
   - Toggle Details - show or hide the node details for all nodes in the member cluster
   - Cluster-level commands

   These are the same commands available when using cctrl (in [Tungsten Clustering (for MySQL) 6.1 Manual]), i.e.:

   ```shell
   $ cctrl
   [LOGICAL] /east > (your_selected_command_here)
   ```

   **Note**
   The cluster service name displayed will be the service name of the node you are logged into.

   - Heartbeat
   - Recover
   - Switch
   - Failover

   - Composite datasource-level commands

   These are the same commands available when using cctrl -multi followed by use {composite_service_name_here}, i.e.:

   ```shell
   $ cctrl -multi
   [LOGICAL] / > use world
   [LOGICAL] /world > datasource {cluster_member_service_here} {your_selected_command_here}
   ```

   Here are some individual examples:

   ```shell
   [LOGICAL] /world > datasource east recover
   [LOGICAL] /world > datasource west fail
   [LOGICAL] /world > switch to west
   ```

   - Recover
   - Welcome
   - Online
   - Offline
   - Shun
   - Promote - this is the same as doing a switch to {cluster_member_service_here}
   - Fail

9. Locking status text and icon with dropdown menu to allow lock control.

   **Important**
   Under normal circumstances, you should not need to get a lock, since all operations automatically attempt to obtain a lock for efficiency purposes.

10. Refresh - triggers an AJAX refresh of that member cluster only (no page load)

11. Collapse - hide the node rows for that member cluster only
12.7. Dashboard Composite Member Node Rows

A node row contains controls for that one specific cluster node.

Cluster nodes may have one of the following roles: Primary, Replica, Witness or Standby. Composite member cluster nodes may also have the Relay role.

For any cluster, there will be only one Primary/Relay cluster node and any number of Replica nodes.

A Cluster Primary node is assigned the special role of Relay when it is part of a Composite Passive cluster.

Active witness nodes do not have a database and therefore do not run a replicator. Passive witness nodes do not appear because they have no Manager process running.

Figure 12.7. Example Composite Member Node Rows

<table>
<thead>
<tr>
<th>Node</th>
<th>Role</th>
<th>DS State</th>
<th>Conns</th>
<th>Archive</th>
<th>Repl. State</th>
<th>applied</th>
<th>relative</th>
<th>Seqno</th>
<th>minStored</th>
<th>maxStored</th>
<th>pipelineSource</th>
<th>Dataserver</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>db1</td>
<td>relay</td>
<td>ONLINE</td>
<td>0/3</td>
<td>ONLINE</td>
<td></td>
<td>0.202</td>
<td>0.244</td>
<td>116394172</td>
<td>114503817</td>
<td>116394175</td>
<td>tht://db4:2112/</td>
<td>ONLINE</td>
<td></td>
</tr>
<tr>
<td>db2</td>
<td>slave</td>
<td>ONLINE</td>
<td>0/0</td>
<td>ONLINE</td>
<td></td>
<td>0.227</td>
<td>0.246</td>
<td>116394172</td>
<td>114503817</td>
<td>116394172</td>
<td>tht://db1:2112/</td>
<td>ONLINE</td>
<td></td>
</tr>
<tr>
<td>db3</td>
<td>slave</td>
<td>ONLINE</td>
<td>0/0</td>
<td>ONLINE</td>
<td></td>
<td>0.237</td>
<td>0.253</td>
<td>116394172</td>
<td>114503817</td>
<td>116394175</td>
<td>tht://db1:2112/</td>
<td>ONLINE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Node</th>
<th>Role</th>
<th>DS State</th>
<th>Conns</th>
<th>Archive</th>
<th>Repl. State</th>
<th>applied</th>
<th>relative</th>
<th>Seqno</th>
<th>minStored</th>
<th>maxStored</th>
<th>pipelineSource</th>
<th>Dataserver</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>db4</td>
<td>master</td>
<td>ONLINE</td>
<td>2/2527</td>
<td>ONLINE</td>
<td></td>
<td>0.095</td>
<td>0.105</td>
<td>116394170</td>
<td>114503817</td>
<td>116394171</td>
<td>/var/lib/mysql</td>
<td>ONLINE</td>
<td></td>
</tr>
<tr>
<td>db5</td>
<td>slave</td>
<td>ONLINE</td>
<td>0/1</td>
<td>ONLINE</td>
<td></td>
<td>1.063</td>
<td>1.105</td>
<td>116394167</td>
<td>114503817</td>
<td>116394171</td>
<td>tht://db4:2112/</td>
<td>ONLINE</td>
<td></td>
</tr>
<tr>
<td>db6</td>
<td>witness</td>
<td>ONLINE</td>
<td>0/1</td>
<td>ONLINE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Node** - the hostname of the server
- **Role** - one of Primary, Relay, Replica, Standby or Witness
- **DS State** - DataSource state can be **ONLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]), **OFFLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]), SHUNNED or FAILED. There may be other, less-used values.
- **Conns** - number of active connections / total number of connections created since last restart
- **Archive** - has Archive mode been enabled? See [Mark a Datasource as Archive](in [Tungsten Clustering (for MySQL) 6.1 Manual]) for more information.
- **Repl. State** - the state of the Replicator process, one of: **ONLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]), **OFFLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) or ERROR
- **applied** - the **appliedLatency** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) value, which is how long it took to actually get the event either extracted from the Primaries binary logs or applied into the Replicas target database
- **relative** - the **relativeLatency** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) value, which is how long it has been since we performed an action
- **Seqno** - the **appliedLastSeqno** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) value
- **minStored** - the **minimumStoredSeqNo** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) value, which is the sequence number of the oldest event stored in the THL
- **maxStored** - the **maximumStoredSeqNo** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) value, which is the sequence number of the latest event to be stored in the THL
- **pipelineSource** - the protocol, host and port where the replicator is pulling THL from
- **Dataserver** - the state of the database server, one of **ONLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]), **OFFLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) or **UNKNOWN**
- **Actions** - the node-specific commands dropdown menu. There are four distinct types of choices in this dropdown menu.
  - **UI-Specific**
    - For all nodes that have a running Replicator, the installed Tungsten version will be the first item visible.
    - **Toggle Details** - show or hide the node details for that specific node
    - **DataSource (Node-level) Commands**

47
These are the same commands available when using `cctrl` (in [Tungsten Clustering (for MySQL) 6.1 Manual]), i.e.:

```
shell> cctrl
[LOGICAL] /east > datasource {node_hostname_here} {your_selected_command_here}
```

**Note**

The cluster service name displayed will be the service name of the node you are logged into.

- **Recover**
- **Welcome**
- **Offline** - only appears if the DataSource is in the **ONLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) state
- **Online** - only appears if the DataSource is in the **OFFLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) state
- **Fail**

**Replicator-specific DataSource (Node-level) Commands**

These are the same commands available when using `cctrl` (in [Tungsten Clustering (for MySQL) 6.1 Manual]), i.e.:

```
shell> cctrl
[LOGICAL] /east > replicator {node_hostname_here} {your_selected_command_here}
```

Here are some individual examples:

```
[LOGICAL] /world > replicator db1 online
[LOGICAL] /world > replicator db3 offline
```

- **Offline** - only appears if the Replicator is in the **ONLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) state
- **Online** - only appears if the Replicator is in the **OFFLINE** (in [Tungsten Clustering (for MySQL) 6.1 Manual]) state

**Replica-specific DataSource (Node-level) Commands**

**Important**

These are commands are ONLY available on a node with the Replica or Standby roles. Nodes with either Primary, Relay or Witness roles will not display the Replica-specific menu options.

These are the same commands available when using `cctrl` (in [Tungsten Clustering (for MySQL) 6.1 Manual]), i.e.:

```
shell> cctrl
[LOGICAL] /east > datasource {node_hostname_here} {your_selected_command_here}
```

Here are some individual examples:

```
[LOGICAL] /world > datasource db1 shun
[LOGICAL] /world > datasource db3 recover
[LOGICAL] /world > switch to db2
```

- **Backup**
- **Restore**
- **Shun**
- **Enable Standby**
- **Disable Standby**
- **Promote** - this is the same as doing a switch to `{node_hostname_here}`

### 12.8. Dashboard Standalone Cluster

All of the controls and information are the same for Standalone clusters and nodes as they are for Composite with the following exceptions:

- A Standalone Cluster is not part of a Composite.
- There will be no Composite commands in the service-level dropdown menu.
## Figure 12.8. Example Standalone Cluster

<table>
<thead>
<tr>
<th>Node</th>
<th>Role</th>
<th>OS State</th>
<th>Caches</th>
<th>Archive</th>
<th>Prev State</th>
<th>applied</th>
<th>relative</th>
<th>Segreg</th>
<th>mached</th>
<th>mached</th>
<th>pipelineSource</th>
<th>Detector</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>db1</td>
<td>master</td>
<td>ONLINE 2/5</td>
<td>-</td>
<td>ONLINE 0.396</td>
<td>0.4</td>
<td>131878022</td>
<td>130023799</td>
<td>131878022</td>
<td>/var/lib/mysql</td>
<td>ONLINE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>db2</td>
<td>slave</td>
<td>ONLINE 0/0</td>
<td>-</td>
<td>ONLINE 0.398</td>
<td>0.403</td>
<td>131878010</td>
<td>130023799</td>
<td>131878018</td>
<td>th://db2:2112/</td>
<td>ONLINE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>db3</td>
<td>slave</td>
<td>ONLINE 0/0</td>
<td>-</td>
<td>ONLINE 0.424</td>
<td>0.445</td>
<td>131878018</td>
<td>130023799</td>
<td>131878028</td>
<td>th://db1:2112/</td>
<td>ONLINE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 13. Send a Dashboard Diagnostic to Support

Upload a Dashboard Diagnostic Package to Continuent Support

Version 1.0.9. This feature was first introduced in Tungsten Dashboard version 1.0.9-61

Figure 13.1. Tungsten Dashboard Send Diagnostic Menu Option
Enter the appropriate case number and customer name then click the "Yes, Upload" button to send the diagnostic to Support.

The diagnostic contains the JSON configuration of the dashboard.

This JSON text is uploaded to Continuent Support's protected AWS bucket. No other customer has access to this location, it is upload-only.

The Diagnostic feature is also available by clicking the appropriate icon in the top tool bar.
Figure 13.3. Tungsten Dashboard Send Diagnostic Success

If you do not have the proper upload-specific access and secret keys configured, you would see an error like this:
Figure 13.4. Tungsten Dashboard Send Diagnostic Failure Due to Missing Keys

```
ERROR: Tungsten Dashboard diag failed - uploadAccessKey missing, uploadSecretKey missing
```
Appendix A. Dashboard Frequently Asked Questions (FAQ)

The following details information should be considered when using the Tungsten Dashboard:

- A DS state of ONLINE (in [Tungsten Clustering (for MySQL) 6.1 Manual]) when the node role is Witness means that the manager is online only. An Active Witness node will never be a live DataSource because it has no database and no replicator.

- Passive Witness nodes will NOT appear because they have no running Manager/API.

- The Tab Menu Badges for Policy Not Auto and Not Ready auto-refresh via AJAX every 30 seconds independently of the main Auto-refresh Setting.

- The Show All Details button is useful when used with the native browser search.

- All operations will attempt to obtain a lock automatically.

- An auto-lock request will fail if the resource is already locked.

- Composite and Cluster Status may be one of: Ready, Warning or Error.

- For a Composite to be other than Ready, a Member cluster must be OFFLINE (in [Tungsten Clustering (for MySQL) 6.1 Manual]) or FAILED (in [Tungsten Clustering (for MySQL) 6.1 Manual]) from the Composite view. A single failed node will NOT change the Composite Status.

- There is no impact on the Manager API if security is enabled via --disable-security-controls=false (in [Tungsten Clustering (for MySQL) 6.1 Manual]).

- The Manager API calls are not encrypted with SSL by default.

- Filtering is only available with more than one cluster.

- Filtering is case-insensitive with automatic wildcards on both ends.
Appendix B. Release Notes

B.1. Tungsten Dashboard 1.0.9 GA (12 August 2020)

Version End of Life. 11 August 2021

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

Tungsten Dashboard v1.0.9 provides a number of new features, improvements and bugfixes.

Dashboard Configuration

- Now able to configure Dashboard settings via the browser
  
  You can disable the editing of settings in the browser by changing the value of `disableSettingsEdit` to 1 in the `config.php` file, in the `{ }` stanza:

  ```json
  "disableSettingsEdit": 1
  ```

- All settings configured via the browser page are stored in the `{webroot}/settings.d/` directory as individual JSON text files named for the setting. Please ensure it exists and is writable by the web server user.

- You may edit or delete any of the files in the `{webroot}/settings.d/` directory. The setting will revert to the default if deleted. you may also choose to configure settings in this way as opposed to using the config.php file. Your choice.

- Refactored all options and created centralized defaults

Software Update

- Now able to self-update the Dashboard software via the browser
  
  There are four related settings, `enableUpdates`, `tmpDir`, `downloadAccessKey` and `downloadSecretKey`.

  All four must be located in the `config.php` file, in the `{settings}: {}` stanza. They are not accessible from the browser settings page.

  You can disable the Dashboard self-update feature by changing the value of `enableUpdates` to 0 in `config.php` (default: 1):

  ```json
  "enableUpdates": 1
  ```

  The `tmpDir` value is used to determine where downloaded software packages are saved to:

  ```json
  "tmpDir": "/tmp"
  ```

  The other two (`downloadAccessKey` and `downloadSecretKey`) need to be obtained from Continuent support and typically ship with the Dashboard installation package.

Cluster Definitions

- Now able to manually create and save cluster definitions in the `conf.d` Subdirectory. Originally, a cluster could only be defined in the `{clusters}: {}` stanza.

- Now able to create and save cluster definitions to the `conf.d` Subdirectory via a browser workflow

- Added Display, Edit and Remove Cluster Definition menu choices for each cluster

- Now able to automatically define cluster definitions in `conf.d` just by providing a hostname and port number in a browser workflow

- Now able to automatically define cluster definitions in `conf.d` at Dashboard startup

  There are three related settings, `enableAutoConfiguration`, `managerPort` and `useHAProxy`.

  You can enable the Dashboard auto-configuration feature by changing the "Enable Auto-Configuration?" setting via the Dashboard settings page in the browser, or changing the value of `enableAutoConfiguration` to 1 in `config.php` (default: 0) or via the Dashboard settings page in the browser:

  ```json
  "enableAutoConfiguration": 1
  ```

  The `managerPort` value is used to determine what port to communicate with the manager upon when performing auto-configuration and auto-define, as well as populating form fields in other places. Only change this if you have change the API listener port for the Manager as well.
The `useHAProxy` value is used to determine how to calculate ports when performing auto-configuration and auto-define.

Set the value to 1 to determine the manager port number automatically during various operations based on calculations using the base managerPort.

Set the value to 0 [default] to use the base managerPort with no attempt to auto-define the port.

You can enable the manager port auto-configuration feature by changing the "Using HA Proxy?" setting via the Dashboard settings page in the browser, or changing the value in the `config.php` file.

```json
"useHAProxy": 1
```

UI/UX

- Role name cleaning (Master is now Primary, and Slave is now Replica for nodes; Master is now Active, and Slave is now Passive for clusters)
- Improve error handling for JSON responses to AJAX calls
- Bug fixes in service alias support
- Many footer improvements, including a link to check for an available Dashboard software update
- Stop providing `tabInfo` during initial page load, instead do it as AJAX call after load to save initial page load time

Dashboard Diagnostics

- Now able to upload a Dashboard Diagnostic containing the JSON configuration to Continuent Support's protected AWS bucket. No other customer has access to this location, it is upload-only.

There are three related settings, `customerName`, `uploadAccessKey` and `uploadSecretKey`.

The `customerName` value is used to pre-populate the diagnostic upload form.

```json
"customerName": "your customer name here"
```

The other two (`uploadAccessKey` and `uploadSecretKey`) need to be located in `config.php`

```json
"uploadAccessKey": "AKIAIWDZPQUE5YL4SBDQ",
"uploadSecretKey": "FQ0iVkTtH9biIZT2+IpwXh7vSf6Mxw9Zc6+7cX2nq4gN6k"
```

Misc Admin

- New Expert mode disables both confirmation prompts when Deleting All Definitions

The default is 0 [disabled]. Set `enableExpertMode` to 1 [one] to enable.

```json
"enableExpertMode": 1
```

- Use the `enableDebug` setting to get additional logging information and use the debug software versions when checking for an available update.

```json
"enableDebug": 1
```

**B.2. Tungsten Dashboard 1.0.8 GA (4 June 2020)**

Version End of Life. 3 June 2021

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

Tungsten Dashboard v1.0.8 provides a number of new features, improvements and bugfixes.

- Added basic Role-Based Access Control (RBAC). There are two roles, Administrator with full access and Operator with Read-Only access. This feature requires Basic Auth to be properly configured on the Web server.

When enabled, the user’s current role will be displayed in the footer. Refresh the page to activate any changes.

The default is 0 [disabled]. Set `enableRBAC` to 1 [one] to enable.

```json
"enableRBAC": 1
```

Use the `administrators` setting to list the users with admin privs:
Release Notes

"administrators": [ "adminUser1","adminUser2" ]

• Improved page load performance via caching of API calls. This is especially helpful with Composite clusters that have multiple sites over a wide area.

• Added the ability to modify the browser window title using the new configuration option `windowTitle`

• Added the ability to change the cluster service sort order from the alpha default to as-written configuration order using the new configuration option `sortByConfigOrderNotAlpha`

• Site favicons along with the navigation bar logo and colors have been updated to promote a cleaner look. Additional icon replacements and color tweaks have been made throughout the tool.

• Added hover-based tooltips for all fields and buttons where possible. Set `disableTooltips` to 1 to prevent the tooltips from appearing.

• Significantly improved the Connector popover formatting, sorting and operation.

• Message handling is improved so that multiple actions and responses are tracked and messaged properly.

• Added the ability to view the json configuration in the browser via a menu link.

• Added the ability to check for Dashboard software updates.

• Added the ability to check for Clustering software updates on a per-node basis.

Tungsten Dashboard is compatible with both the Tungsten Clustering 5.3.x series and 6.x series.

B.3. Tungsten Dashboard 1.0.7 GA (26 November 2019)

Version End of Life. 26 November 2020

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

Tungsten Dashboard v1.0.7 provides a number of new features, improvements and bugfixes.

• Added the feature to allow for cluster service name aliases. You may now add the sub-key `actualName` pointing to the "real" name of the service, and change the top-level cluster service name to some alias that you understand.

  Previously, it was impossible to configure two or more clusters with the same service name. This could be required if clusters were installed into different environments like production, staging or development. While the best practice is to name the cluster services to match the environment (i.e. east_prod and east_staging), in some situations this may not be possible.

• Added a new feature to automatically fade out messages after a delay. The default is 60 seconds. Set `msgFadeOutTimer` to 0 (zero) to disable or to a positive integer to specify the delay in seconds.

```
"msgFadeOutTimer":60
```

• Improved the look & feel of the overall layout, including display widths, the location of the timestamp marker and spacing.

• Fixed a bug where the controls to open and close a cluster were STILL not working.

• Fixed a bug where the datasource status details hover was not displaying properly.

Tungsten Dashboard is compatible with both the Tungsten Clustering 5.3.x series and 6.x series.

B.4. Tungsten Dashboard 1.0.6 GA (3 September 2019)

Version End of Life. 3 September 2020

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

Tungsten Dashboard v1.0.6 is a bugfix and minor feature release.

• Fixed a bug where the controls to open and close a cluster were not working.

• When Auto-refresh is turned on, any issuance of a command will stop the auto-refresh. Simply re-select your desired refresh rate to turn it back on.

Tungsten Dashboard is compatible with both the Tungsten Clustering 5.3.x series and 6.x series.

57
B.5. Tungsten Dashboard 1.0.5 GA (28 June 2019)

Version End of Life. 28 June 2020

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

Tungsten Dashboard v1.0.5 is a bugfix release.

- Fixed CMM cluster bug where clusters other than the first do not show subservices.
- Tweaked cell alignment

Tungsten Dashboard is compatible with both the Tungsten Clustering 5.3.x series and 6.x series.

B.6. Tungsten Dashboard 1.0.4 GA (11 April 2019)

Version End of Life. 11 April 2020

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

Tungsten Dashboard v1.0.4 is a bugfix release.

- Fixed cluster-level open/close regression.
- Tweaked error text and reduced noise in the logs.

Tungsten Dashboard is compatible with both the Tungsten Clustering 5.3.x series and 6.x series.

B.7. Tungsten Dashboard 1.0.3 GA (22 March 2019)

Version End of Life. 22 March 2020

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

Tungsten Dashboard v1.0.3 is a feature release for better global controls and customization.

The default for navButtonFormat is icon if not specified.

- Added modal "Stop Auto-Refresh" button which will turn off the Auto-refresh feature. This button is only visible if auto-refresh is enabled.
- Added ability to set global buttons to icon, text or some combination. Use the setting navButtonFormat and specify one or more of icon or text as a comma-separated string, no spaces. Order counts.

```
$jsonConfig = <<<EOJ
{
    "settings": {
        "navButtonFormat": "icon",
        ...
    }
EOJ;
```

Currently there are four (4) possible entries:

```
"navButtonFormat": "icon",
"navButtonFormat": "text",
"navButtonFormat": "icon,text",
"navButtonFormat": "text,icon",
```

Tungsten Dashboard is compatible with both the Tungsten Clustering 5.3.x series and 6.x series.

B.8. Tungsten Dashboard 1.0.2 GA (20 September 2018)

Version End of Life. 20 September 2019

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

Tungsten Dashboard v1.0.2 is a bug fix release for better API error handling.

- Refactored API calls for better error handling.
- Better error reporting on the front-end.
Tungsten Dashboard is compatible with both the Tungsten Clustering 5.3.x series and 6.x series.

B.9. Tungsten Dashboard 1.0.1 GA (17 September 2018)

Version End of Life. 17 September 2019

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

Tungsten Dashboard v1.0.1 is a bug fix release that also contains a few improvements.

- Support for Composite Active/Active topology offered in Continuent Clustering v6.x [requires Continuent Clustering version 6.0.3]
- Improvements to the menu system layout and clarity
- Composite-level cluster commands have been relocated to a new menu to the right of the State field
- Composite clusters now display the actual composite state instead of the Ready/Warning/Error status indicators, and status indicator lights have been moved to the left of the State label
- Improvements to the locking system:
  - Auto-Lock and Auto-Unlock are now both configurable via config.php
  - Auto-Lock and Auto-Unlock setting are now both visible at the bottom of the cluster-level locking menu
  - Auto-Lock may be configured to attempt a lock for all actions, heartbeats only, or not at all
  - Auto-Unlock may be configured to attempt an unlock for all actions, heartbeats only, or not at all
- Additional formatting tweaks, including the reduction in height of the rows

Tungsten Dashboard is compatible with both the Tungsten Clustering 5.3.x series and 6.x series.

B.10. Tungsten Dashboard 1.0.0 GA (10 May 2018)

Version End of Life. 10 May 2019

Tungsten Dashboard provides a web-based UI for monitoring and managing Tungsten Clustering deployments.

It supports the following features:

- Full monitoring information on the status and progress of replication and the status of the cluster
- Monitor multiple clusters through a single page
- Perform switches and failovers
- Shun hosts
- Recover failed hosts

Tungsten Dashboard is compatible with the Tungsten Clustering 5.3.x series.
Appendix C. Upgrade the Tungsten Dashboard

C.1. Manually Updating the Tungsten Dashboard Software

Manually Download and Upgrade the Tungsten Dashboard Software

**Important**

Please change the example values below to match your specific environment.

As user tungsten, download the software using the temporary URL provided by Continuent, or login to the web download portal to obtain the software [https://www.continuent.com/downloads/], then copy the updated application files to the web root directory, overwriting the existing ones:

```bash
shell> sudo su - tungsten
shell> wget -O tungsten-dashboard-1.0.0-123.tar.gz 'TEMP_URL_PROVIDED_BY_CONTINUENT'
shell> tar xvf tungsten-dashboard-1.0.0-123.tar.gz
shell> cd tungsten-dashboard-1.0.0-123
shell> rsync -a html/ /volumes/data/www/tungsten/html/
```

**Note**

Your `config.php` will NOT be overwritten. The software package contains only `config.php.sample`, so there is no risk of affecting your settings during an upgrade.

C.2. Self-Updating the Tungsten Dashboard Software

Automatically Download and Upgrade the Tungsten Dashboard Software

Version 1.0.9. This feature was first introduced in Tungsten Dashboard version 1.0.9-61

Figure C.1. Tungsten Dashboard Self-Update Menu Option
Upgrade the Tungsten Dashboard

You may see a No Update Available message like this:

Figure C.2. Tungsten Dashboard No Update Available

- Click the “Update Now” button to invoke the upgrade. There is no confirmation prompt, the upgrade begins immediately.
- When the upgrade is complete, simply refresh the page fully to get the new version.
- You may need to clear cache and refresh the page again to ensure the latest scripts and styles are loaded properly.
Figure C.4. Tungsten Dashboard Self-Update Success

SUCCESS - Dashboard updated to 1.0.9-62, please click here to refresh the page. If you have any issues, please clear the browser cache and refresh again.

To upgrade manually:
- For the latest software, please visit the Continuent download portal at: https://www.continuent.com/for-customers/downloads
- For more information about how to upgrade by hand, please visit the online documentation at: https://docs.continuent.com/tungsten-dashboard-1.0/tungsten-dashboard-upgrade-dashboard.html

Close window
## Appendix D. UI Operational Scope Table

The following table describes the relationship between the UI elements on screen, their operation and scope, and the equivalent `cctrl` ([in Tungsten Clustering [for MySQL] 6.1 Manual]) command that would be required to achieve the same operation.

<table>
<thead>
<tr>
<th>UI Row Levels</th>
<th>Menu Scope: cctrl Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source {composite_member} recover</td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source {composite_member} welcome</td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source {composite_member} on-line</td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source {composite_member} off-line</td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source {composite_member} shun</td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); switch to {composite_service} promote</td>
</tr>
<tr>
<td>UI Row Levels</td>
<td>MenuScopeCtrl Label</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Composite (com- posite service); data- source (composite _member) fail</td>
</tr>
<tr>
<td>Cluster</td>
<td>Cluster heartbeat use (cluster_service); cluster heartbeat</td>
</tr>
<tr>
<td>Cluster</td>
<td>Cluster use (cluster_service); recover</td>
</tr>
<tr>
<td>Cluster</td>
<td>Cluster use (cluster_service); failover</td>
</tr>
<tr>
<td>Cluster</td>
<td>Cluster use (cluster_service); switch</td>
</tr>
<tr>
<td>Composite</td>
<td>Composite heartbeat use (composite service); cluster heartbeat</td>
</tr>
<tr>
<td>Composite</td>
<td>Composite use (composite service); recover</td>
</tr>
<tr>
<td>Composite</td>
<td>Composite use (composite service); failover</td>
</tr>
<tr>
<td>Composite</td>
<td>Composite use (composite service); switch</td>
</tr>
<tr>
<td>Composite,Cluster</td>
<td>Composite (select-ite,Cluster service); set policy automatic</td>
</tr>
</tbody>
</table>


## UI Operational Scope Table

<table>
<thead>
<tr>
<th>UI Row Levels</th>
<th>MenuScope&lt;sup&gt;ctrl&lt;/sup&gt; Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Composite Cluster Policy to Maintenance</td>
<td>Com-use (select, Cluster Service), set policy maintenance</td>
</tr>
<tr>
<td>Node Online</td>
<td>Node&lt;sup&gt;use&lt;/sup&gt; (Cluster Service); data source (Cluster Node) online</td>
</tr>
<tr>
<td>Node Offline</td>
<td>Node&lt;sup&gt;use&lt;/sup&gt; (Cluster Service); data source (Cluster Node) offline</td>
</tr>
<tr>
<td>Node Welcome</td>
<td>Node&lt;sup&gt;use&lt;/sup&gt; (Cluster Service); data source (Cluster Node) welcome</td>
</tr>
<tr>
<td>Node Shun</td>
<td>Node&lt;sup&gt;use&lt;/sup&gt; (Cluster Service); data source (Cluster Node) shun</td>
</tr>
<tr>
<td>Node Recover</td>
<td>Node&lt;sup&gt;use&lt;/sup&gt; (Cluster Service); data source (Cluster Node) recover</td>
</tr>
<tr>
<td>Node Enable Archive</td>
<td>Node&lt;sup&gt;use&lt;/sup&gt; (Cluster Service); data source (Cluster Node) enable archive</td>
</tr>
<tr>
<td>UI Row Levels</td>
<td>MenuScopeLabel</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

66
<table>
<thead>
<tr>
<th>UI Row Levels</th>
<th>MenuScopeCtrl Label</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node Online</td>
<td>(cluster_node)</td>
<td>clear standby</td>
</tr>
<tr>
<td>Node Online</td>
<td>NodeOnline (cluster_service); replica (cluster_node) online</td>
<td></td>
</tr>
<tr>
<td>Node Offline</td>
<td>NodeOffline (cluster_service); replica (cluster_node) offline</td>
<td></td>
</tr>
</tbody>
</table>
Appendix E. Included External Packages In Use

Continuent Tungsten Dashboard includes the following software in the distribution package:

- bootstrap-3.3.7
- httpful-0.2.20
- jquery-1.12.4
- jsuri-1.3.1