Tungsten Dashboard for Clustering

Continuent Ltd
This manual documents Tungsten Dashboard 1.0.

*Build date: 2020-06-04 (7f8dc6dc)*

Up to date builds of this document: Tungsten Dashboard for Clustering [Online], Tungsten Dashboard for Clustering [PDF]
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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 PHP support (sample configs provided for Apache 2.2 and 2.4)
- 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 Tungsten 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:

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

Inform the running manager of the changed configuration:

```sh
tpm update
```

**Important**

You may need to restart the manager.

Verify that the port is listening:

```sh
sudo netstat -pan | grep 8090
```
Chapter 5. Test Connectivity to the Tungsten Manager API Directly

Test connectivity to the Tungsten Manager API directly using curl:

```bash
shell> curl -s http://db1:8099/manager/status/east/
shell> curl -s http://db4:8099/manager/status/west/
shell> 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/), 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:

```
<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
    #AuthType Basic
    #AuthName "Tungsten Dashboard - RESTRICTED"
    #AuthUserFile /volumes/data/www/tungsten/etc/.htpasswd
    #Require valid-user
  </Directory>
</VirtualHost>
```

For Apache version 2.4:

```
<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
shell> sudo apachectl restart
```

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

To use Apache 2.4 Basic Authentication, uncomment the `RequireAll` section above, comment out the line "Require all granted" then run:
Configure the Apache 2 Web Server

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

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
```

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"
    }
},
```

- 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.
Configure the Tungsten Dashboard

- 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]
  ```

  **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 `enableGrafana` to display a button which opens Grafana in an iframe.

  ```json
  "enableGrafana": 1
  ```

- Added in v1.0.8: Use `enablePrometheus` to display a button which opens Prometheus in an iframe.

  ```json
  "enablePrometheus": 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.
8.1. Tungsten Dashboard Configuration Settings Reference
## Configure the Tungsten Dashboard

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Type</th>
<th>Description</th>
<th>Recommended Value</th>
</tr>
</thead>
</table>
| administra-
ors | AR-
RAY of STRINGS | You may set a list of user names 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 | ["user1","user2","user3"] |
| enableRBAC | BOOLEAN | Any set to 1 to enable 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 | 1 |
| autoLockAll | BOOLEAN | Automatically lock the Dashboard during ANY non-read-only action to prevent other users from performing any non-read- | 1 |
### Variable Name | Default Type | Description | Recommended Value
---|---|---|---
only actions on this cluster. | BOOLEAN | Automatically lock the Dashboard during heartbeat actions to prevent other users from performing any non-read-only actions on this cluster. Overridden by `autoLockAll` | 0 if $autoLockAll=1, 1 otherwise |
controls the Auto-Refresh feature. By default the auto-refresh 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`]. | INTEGER | | 0 |
the list of time intervals in seconds shown on the Auto-Refresh dropdown menu. `autoRefreshList` values less than 3 seconds are strongly discouraged. | INTEGER | | [5, 7, 10, 15, 20, 30, 60, 120, 300, 600] |
| BOOLEAN | normal circumstances, you should not need to get | 1 |
Configure the Tungsten Dashboard

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Recommended Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>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 autoUnlockAll to 1 to automatically unlock the Dashboard after issuing any command.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>autoUnlockHeartbeat</td>
<td>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. You may set autoUnlockHeartbeat to 1 to automatically unlock the Dashboard after issuing a heartbeat command.</td>
<td>1</td>
</tr>
<tr>
<td>dashboardMain- tenanceScreen</td>
<td>You may set dashboardMain- tenanceScreen to 1 to display a &quot;Maintenance-In-</td>
<td>0</td>
</tr>
</tbody>
</table>

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Configure the Tungsten Dashboard

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Type</th>
<th>Description</th>
<th>Recommended Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>disable-ConfigDisplay</td>
<td>BOOLEAN</td>
<td>configDisdisplay to 1 to prevent the menu choice for Tools -&gt; Display Configuration from appearing. Added in v1.0.8</td>
<td>0, 1 if you do not wish read-only access to the configuration via the browser.</td>
</tr>
<tr>
<td>disable-ToolTips</td>
<td>BOOLEAN</td>
<td>configDisdisplay to 1 to prevent the formatted hover-over help tooltips from appearing. Added in v1.0.8</td>
<td>0, 1 if you do not wish read-only access to the configuration via the browser.</td>
</tr>
<tr>
<td>enable-Grafana</td>
<td>BOOLEAN</td>
<td>grafana to 1 to display a &quot;Grafana&quot; button in the top menu, which when clicked will open an iframe to &quot;http://(Dashboard_Server_Hostname):3000&quot;.</td>
<td>0, 1 if you have Grafana available.</td>
</tr>
<tr>
<td>Default Name</td>
<td>Description</td>
<td>Recommended Value</td>
<td>Added in</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>----------</td>
</tr>
<tr>
<td>enablePrometheus</td>
<td>You may set enablePrometheus to 1 to display a &quot;Prometheus&quot; button in the top menu, which when clicked will open an iframe to &quot;http://Dashboard_Server_Host-name:9090&quot;. Added in v1.0.8.</td>
<td>0, 1 if you have Prometheus available</td>
<td>v1.0.8</td>
</tr>
<tr>
<td>jumpToTopOnMsg</td>
<td>The 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 jumpToTopOnMsg is set to the default of 1, the center portal will auto-scroll to the top so the message is visible. Set jumpToTopOnMsg to 0 to disable this behavior and leave the window where it is after a com-</td>
<td>0 if you prefer to scroll on your own, when you are ready to do so</td>
<td>v1.0.8</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Type</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>lockBaseDir</td>
<td>STRING</td>
<td>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 \textit{Tungsten Clustering \texttt{MySQL 6.1 Manual}}] will yield a lock directory of /tmp/locks).</td>
<td></td>
</tr>
<tr>
<td>msFadeOutTimer</td>
<td>INTEGER</td>
<td>Use msFadeOutTimer to automatically close messages after the defined time-out in seconds. Added in v1.0.7</td>
<td></td>
</tr>
<tr>
<td>navButFormat</td>
<td>STRING</td>
<td>Use navButFormat to control the Cluster View control buttons style on the third navigation bar. You may specify one of: &quot;icon&quot;, &quot;text&quot;, &quot;text,icon&quot; or &quot;icon,text&quot; until the Cluster View icons become familiar, then the default value of icon.</td>
<td></td>
</tr>
<tr>
<td>sortByConfigOrder</td>
<td>BOOLEAN</td>
<td>The sortByConfigOrder control sorts the Cluster View. By default, you prefer the Cluster View sort.</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Default</td>
<td>Description</td>
<td>Recommended Value</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>-------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>alpha</td>
<td>tAlpha</td>
<td>fault the list of cluster services is sorted alphabetically. Set sortByConfigOrderNo or tAlpha to 1 for the cluster services to be displayed in the order listed in the config.php file. Added in v1.0.8</td>
<td></td>
</tr>
<tr>
<td>startExpanded</td>
<td>1</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>
<td></td>
</tr>
<tr>
<td>tabUpdateRate</td>
<td>30</td>
<td>The default Tab Badge update rate is 30 seconds. The Tab Bar and associated badges are located in navigation bar two. You may disable it by setting tabUpdateRate to zero (0). You may change the refresh rate in seconds by specifying a non-zero value.</td>
<td></td>
</tr>
<tr>
<td>windowTitle</td>
<td>Tungsten Dashboard</td>
<td>To change the browser window title from the Tungsten Dashboard</td>
<td></td>
</tr>
<tr>
<td>Variable Name</td>
<td>Type</td>
<td>Description</td>
<td>Recommended Value</td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
<td>-------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>default</td>
<td>String</td>
<td>default of &quot;Tungsten Dashboard&quot;</td>
<td>v1.0.8</td>
</tr>
</tbody>
</table>

Added in v1.0.8
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 services and associated hosts:

```
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
    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:

```bash
curl -s http://localhost:8091/manager/status/global/
curl -s http://localhost:8092/manager/status/east/
curl -s http://localhost:8093/manager/status/west/
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 `slave node` `db3` summary row with controls
8. Example Composite cluster member `west` summary row with controls
9. Example cluster `master 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 hierachical 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 Master/Master (CMM) or Composite Master/Slave (CMS). 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.:

```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 Master or Slave role.

There will be only one Master member cluster and any number of slave member clusters.

Figure 12.6. Example Composite Member Rows

1. Cluster type vertical tag [master or slave], 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, Master or Slave. Master and Slave 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:

   ```
   [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: Master, Slave, Witness or Standby. Composite member cluster nodes may also have the Relay role.

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

A Cluster Master node is assigned the special role of Relay when it is part of a Composite Slave 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 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>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>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>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 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>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>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>0/1</td>
<td>0/1</td>
<td>116394167</td>
<td>114503817</td>
<td>116394171</td>
<td>tht://db4:2112/</td>
<td>ONLINE</td>
<td></td>
</tr>
</tbody>
</table>

- **Node** - the hostname of the server
- **Role** - one of Master, Relay, Slave, 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 Master's binary logs or applied into the Slave's 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 minStoredSeqno [in Tungsten Clustering (for MySQL) 6.1 Manual] value, which is the sequence number of the oldest event stored in the THL
- **maxStored** - the maxStoredSeqno [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** [in Tungsten Clustering (for MySQL) 6.1 Manual] - 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**
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

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

**Important**

These are commands are ONLY available on a node with the Slave or Standby roles. Nodes with either Master, Relay or Witness roles will not display the Slave-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>Status</th>
<th>Policy</th>
<th>Type</th>
<th>Connections</th>
<th>Coordinator</th>
<th>Datastore</th>
<th>Pipeline</th>
<th>Source</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>db1</td>
<td>master</td>
<td>ONLINE</td>
<td>2/5</td>
<td>ONLINE</td>
<td>0.396</td>
<td>0.4</td>
<td>131878022</td>
<td>130023799</td>
<td>131878022</td>
<td>/var/lib/mysql</td>
</tr>
<tr>
<td>db2</td>
<td>slave</td>
<td>ONLINE</td>
<td>0/0</td>
<td>ONLINE</td>
<td>0.398</td>
<td>0.403</td>
<td>131878010</td>
<td>130023799</td>
<td>131878018</td>
<td>th://db1:2112/</td>
</tr>
<tr>
<td>db3</td>
<td>slave</td>
<td>ONLINE</td>
<td>0/0</td>
<td>ONLINE</td>
<td>0.424</td>
<td>0.445</td>
<td>131878018</td>
<td>130023799</td>
<td>131878028</td>
<td>th://db1:2112/</td>
</tr>
</tbody>
</table>
Chapter 13. Monitoring Tungsten Clusters Using Prometheus and Grafana

Tungsten Dashboard has introduced basic support for using Prometheus and Grafana to monitor Tungsten Clusters. As of Tungsten Clustering software v6.1.4, key Prometheus exporters have been added to the distribution. These exporters will allow a Prometheus server to gather metrics for:

- the MySQL server and the underlying node "hardware" using external binaries added to the distribution
- the Tungsten Manager, Replicator and Connector using new built-in functionality

A new script has been included to assist with the management and testing of the exporters called tmonitor.

To learn more about the tmonitor command and the included exporters, please visit ??? for more information.

IMPORTANT: To get the most benefit out of the exporters along with ensuring both ease of configuration and security, Continuent requires that both the Prometheus and Grafana servers be installed onto the same instance hosting the Dashboard web server when using the Prometheus and Grafana integration with Dashboard.

13.1. Monitoring Tungsten Clusters Using Prometheus

The below example procedure is designed to help you get Prometheus installed and working with the goal of monitoring Tungsten Clusters through the Dashboard.

This section of the documentation is a summary guide for how to install an external software product, Prometheus. The usual caveats apply, and as always, your mileage may vary.

For more information about getting started with Prometheus, please visit the Prometheus website at https://prometheus.io/docs/introduction/first_steps/

13.1.1. Example Prometheus Installation Procedure

First, download the tarball from https://prometheus.io/download/

Next, go to the install directory, normally /usr/local, and extract the tarball. Complete the Prometheus software installation by creating a symbolic link for convenience when upgrading.

```shell
cd /usr/local
sudo tar xvzf {tarball_fullpath_here}
sudo ln -s {extracted_dir} prometheus
```

In this step, create the Prometheus user and directories you will need, along with setting proper ownership. Be sure to modify the examples to match your environment.

```shell
sudo useradd -rs /bin/false prometheus
sudo mkdir -p ~prometheus/data/
sudo mkdir -p ~prometheus/var/
sudo touch ~prometheus/var/prometheus.log
sudo chown -R prometheus: /usr/local/prometheus* ~prometheus
```

13.1.2. Example Prometheus Configuration Procedure

The below example shows three (3) 3-node clusters for a total of nine (9) nodes.


Create anew or edit the existing Prometheus configuration file, normally /usr/local/prometheus/prometheus.yml, and adjust the file to match your specific needs.

```shell
sudo vi /usr/local/prometheus/prometheus.yml
```

# sample config for monitoring Tungsten Clusters

global:
  scrape_interval: 15s # Set the scrape interval to every 15 seconds. Default is every 1 minute.
  evaluation_interval: 15s # Evaluate rules every 15 seconds. The default is every 1 minute.
  scrape_timeout: set to the global default (10s).
# Alertmanager configuration

alerting:
  alertmanagers:
  - static_configs:
    - targets:
      # - alertmanager:9093
  # Load rules once and periodically evaluate them according to the global 'evaluation_interval'.
  rule_files:
  - "first_rules.yml"
  - "second_rules.yml"

# A scrape configuration containing exactly one endpoint to scrape:
# Here it's Prometheus itself.

scrape_configs:
  # The job name is added as a label `job=<job_name>` to any timeseries scraped from this config.
  - job_name: 'prometheus'
    # metrics_path defaults to '/metrics'
    # scheme defaults to 'http'.
    static_configs:
      - targets: ['localhost:9090']
      - job_name: 'node'
        scrape_interval: 15s
        static_configs:
    - job_name: 'mysql'
      scrape_interval: 15s
      static_configs:
    - job_name: 'tungsten_manager'
      scrape_interval: 15s
      static_configs:
    - job_name: 'tungsten_connector'
      scrape_interval: 15s
      static_configs:
        - targets: ['db1:8092','db2:8092','db3:8092','db4:8092','db5:8092','db6:8092','db7:8092','db8:8092','db9:8092']
    - job_name: 'tungsten_replicator'
      scrape_interval: 15s
      static_configs:

13.1.3. Example Prometheus Boot Configuration Procedures

- init.d-based procedure

Create the `prometheus` boot script for init.d:

```bash
#!/bin/bash
# /
# /etc/rc.d/init.d/prometheus
#
# Prometheus monitoring server
#
# chkconfig: 2345 20 80 Read
# description: Prometheus monitoring server
# processname: prometheus
#
# Source function library.
# /etc/rc.d/init.d/functions

PROGNAME=prometheus
HOMEDIR="/home"
INSTALLDIR="/usr/local"

# Source function library.
# /etc/rc.d/init.d/functions

# # Source function library.
# /etc/rc.d/init.d/functions

PROGDIR=$INSTALLDIR/$PROGNAME
CONFIG_FILE=$INSTALLDIR/$PROGNAME/$PROGNAME.yml
USER=$PROGNAME

DATAUSER=$HOME
LOGFILE=$DATAUSER/var/$PROGNAME.log
LOCKFILE=$DATAUSER/var/$PROGNAME.pid
```
Enable the `prometheus` service to start at boot time via `chkconfig`, and then start it using `service`:

```
shell> sudo chkconfig --add prometheus
shell> sudo chkconfig --list | grep prometheus
shell> sudo service prometheus start
shell> sudo service prometheus status
```

- systemd-based procedure

Create the `prometheus.service` boot script for systemd:

```
shell> sudo vi /etc/systemd/system/prometheus.service

[Unit]
Description=Prometheus
After=network.target

[Service]
User=prometheus
Group=prometheus
Type=simple
ExecStart=/usr/local/bin/prometheus \
   --config.file=/usr/local/prometheus/prometheus.yml \
   --storage.tsdb.path=/home/prometheus/data \
   --web.enable-admin-api

[Install]
WantedBy=multi-user.target
```

Use `systemctl` to reload the boot config, enable the `prometheus` service to start at boot time, and then start Prometheus:

```
shell> sudo systemctl daemon-reload
shell> sudo systemctl enable prometheus
shell> sudo systemctl start prometheus
```

**13.1.4. Example Prometheus Test Procedure**

Once the Prometheus server has been started, you may test that it is running via browser URL `http://{yourServer}:9090/graph`
Prometheus may now be added to the Dashboard via the `config.php` file in the Dashboard WEBROOT directory. Add the configuration option "enablePrometheus":1 and refresh the Dashboard page in the browser to see the additional button in the top navigation bar.

For more information about next steps with Prometheus, please visit the Prometheus website at https://prometheus.io/docs/introduction/first_steps/

13.2. Monitoring Tungsten Clusters Using Grafana

The below example procedure is designed to help you get Grafana installed and working with the goal of monitoring Tungsten Clusters through the Dashboard.

This section of the documentation is a summary guide for how to install an external software product, Grafana. The usual caveats apply, and as always, your mileage may vary.

For more information about getting started with Grafana, please visit the Grafana website at https://grafana.com/docs/grafana/latest/guides/getting_started/

13.2.1. Example Grafana Installation Procedure

This procedure example uses the YUM-based method. For other ways to install Grafana, please visit the Grafana install page at https://grafana.com/docs/grafana/latest/installation/

First, create the YUM repository configuration file for Grafana:

```
shell> sudo vi /etc/yum.repos.d/grafana.repo
[grafana]
name=grafana
baseurl=https://packages.grafana.com/oss/rpm
repo_gpgcheck=1
enabled=1
gpgcheck=1
gpgkey=https://packages.grafana.com/gpg.key
sslverify=1
sslcacert=/etc/pki/tls/certs/ca-bundle.crt
```

Install Grafana using `yum`:

```
shell> sudo yum install grafana
```

13.2.2. Example Grafana Configuration Procedure

In order to use the Grafana integration with the Tungsten Dashboard, one line needs to be added to the [security] stanza in the Grafana configuration file (normally `/etc/grafana/grafana.ini`). This setting is usually commented out and set to false, so just add a new line under the comment:

```
shell> sudo vi /etc/grafana/grafana.ini
...
[security]
allow_embedding = true
...
```

13.2.3. Example Grafana Boot Configuration Procedure

The YUM-based install automatically creates the grafana user, along with the systemd and init.d boot scripts. This means you do not have to create the boot scripts by hand!

- init.d-based procedure

  Enable the grafana-server service to start at boot time via `chkconfig`, and then start it using service:

```
shell> sudo chkconfig --add grafana-server
shell> sudo chkconfig --list | grep grafana-server
shell> sudo service grafana-server start
shell> sudo service grafana-server status
```

- systemd-based procedure

  Use systemctl to reload the boot config, enable the grafana-server service to start at boot time, and then start Grafana:

```
shell> sudo systemctl daemon-reload
shell> sudo systemctl enable grafana-server
shell> sudo systemctl start grafana-server
```
13.2.4. Example Grafana Test Procedure

Once the Grafana server has been started, you may test that it is running via browser URL http://{yourServer}:3000

Login as user admin with a password of admin, and please change the admin password when prompted to do so.

Grafana may now be added to the Dashboard via the config.php file in the Dashboard WEBROOT directory. Add the configuration option "enableGrafana":1 and refresh the Dashboard page in the browser to see the additional button in the top navigation bar.

For more information about next steps with Grafana, please visit the Grafana website at https://grafana.com/docs/grafana/latest/guides/getting_started/

13.2.5. Example Grafana Setup and Usage

Once logged into the Grafana server as admin, you may configure a data source and import the dashboards.

- Create a data source using Prometheus
  
  Click the Configuration cog on the left nav bar, then click "Add data source". Choose prometheus, then add 'http://localhost:9090' to the HTTP URL field, then click Save & Test at the bottom. This should create a new data source named 'Prometheus for use a few steps below.

- Optional Step: Import the included Prometheus and Grafana Dashboards
  
  If you want to use the built-in metrics for Prometheus and/or Grafana, import the included dashboards as desired.
  
  Click on the Dashboards Tab in the center window to the right of the Settings Tab, then click on the blue Import button for each of Prometheus Stats, Prometheus 2.0 Stats and Grafana metrics.

- Import the Node Exporter Full Dashboard
  
  Hover over the Dashboards icon in the left nav bar, then select Manage from the sub-menu. Click the Import link to the right of the green New Dashboard button.

  In the Grafana.com Dashboard field, enter 1860 for the Node Exporter Full dashboard, then click Load.

  Select the Prometheus data source, then click the green Import button.

  If you have Prometheus setup correctly and running, you should see results instantly.

  Save this Dashboard by clicking the 3.5 inch floppy icon in the upper-right corner, then click the green Save button.

  Click the star in the upper-right corner to make this dashboard a favorite. This makes finding the dashboard MUCH easier.

- Import the Percona MySQL Dashboard
  
  Hover over the Dashboards icon in the left nav bar, then select Manage from the sub-menu. Click the Import link to the right of the green New Dashboard button.

  In the Grafana.com Dashboard field, enter 7362 for the Percona MySQL dashboard, then click Load.

  Select the Prometheus data source, then click the green Import button.

  If you have Prometheus setup correctly and running, you should see results instantly.

  Save this Dashboard by clicking the 3.5 inch floppy icon in the upper-right corner, then click the green Save button.

  Click the star in the upper-right corner to make this dashboard a favorite. This makes finding the dashboard MUCH easier.

- Import the Continuent Dashboard
  
  For more information about next steps with Grafana, please visit the Grafana website at https://grafana.com/docs/grafana/latest/guides/getting_started/
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 1.0.8 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 to config.php.

  The default is 0 (disabled). Set enableRBAC to 1 (one) to enable.

  "enableRBAC":1

  Use the administrators setting to list the users with admin privs:

  "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.2. 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.3. 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.

B.4. 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.5. 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.6. 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.

```json
$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.7. 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.8. 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 Multimaster 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-Unock 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.9. 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

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:

```
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.
## 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` (cctrl [in Tungsten Clustering (for MySQL) 6.1 Manual]) command that would be required to achieve the same operation.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>MenuScope</th>
<th>Label</th>
<th>cctrl Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lev-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Row</td>
<td>els</td>
<td></td>
</tr>
<tr>
<td>Clus-</td>
<td>MenuScope:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ter</td>
<td>cctrl</td>
<td></td>
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<td></td>
<td>Equiva-</td>
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<tr>
<td></td>
<td>lent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source (composite member)</td>
<td>recover</td>
<td></td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source (composite member)</td>
<td>welcome</td>
<td></td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source (composite member)</td>
<td>online</td>
<td></td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source (composite member)</td>
<td>offline</td>
<td></td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); data source (composite member)</td>
<td>shun</td>
<td></td>
</tr>
<tr>
<td>Cluster</td>
<td>Com-Com-use (composite service); switch to</td>
<td>promote</td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>UI Row Levels</th>
<th>MenuScopectrl Label</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster</td>
<td>Com-Composite (com-posite; data-source (composite_member) fail</td>
<td></td>
</tr>
<tr>
<td>Cluster</td>
<td>Heartbeat</td>
<td>Cluster heartbeat</td>
</tr>
<tr>
<td>Cluster</td>
<td>Recover</td>
<td>Cluster use (cluster_service); recover</td>
</tr>
<tr>
<td>Cluster</td>
<td>Failover</td>
<td>Cluster use (cluster_service); failover</td>
</tr>
<tr>
<td>Cluster</td>
<td>Switch</td>
<td>Cluster use (cluster_service); switch</td>
</tr>
<tr>
<td>Composite</td>
<td>Heartbeat</td>
<td>Composite use (composite_service); cluster heartbeat</td>
</tr>
<tr>
<td>Composite</td>
<td>Recover</td>
<td>Composite use (composite_service); recover</td>
</tr>
<tr>
<td>Composite</td>
<td>Failover</td>
<td>Composite use (composite_service); failover</td>
</tr>
<tr>
<td>Composite</td>
<td>Switch</td>
<td>Composite use (composite_service); switch</td>
</tr>
<tr>
<td>Composite,Cluster</td>
<td>Set Policy to Automatic</td>
<td>Composite use (select;Cluster_service); set policy automatic</td>
</tr>
<tr>
<td>UI Row Levels</td>
<td>MenuScope</td>
<td>Equivalent</td>
</tr>
<tr>
<td>---------------</td>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>Composite_Cluster</td>
<td>Set Policy to Maintenance</td>
<td>Com-use (select_Cluster_Service); set policy maintenance</td>
</tr>
<tr>
<td>Node</td>
<td>Online</td>
<td>Node use (Cluster_Service); data source (Cluster_Node) online</td>
</tr>
<tr>
<td>Node</td>
<td>Offline</td>
<td>Node use (Cluster_Service); data source (Cluster_Node) offline</td>
</tr>
<tr>
<td>Node</td>
<td>Welcome</td>
<td>Node use (Cluster_Service); data source (Cluster_Node) welcome</td>
</tr>
<tr>
<td>Node</td>
<td>Shun</td>
<td>Node use (Cluster_Service); data source (Cluster_Node) shun</td>
</tr>
<tr>
<td>Node</td>
<td>Recover</td>
<td>Node use (Cluster_Service); data source (Cluster_Node) recover</td>
</tr>
<tr>
<td>Node</td>
<td>Enable Archive</td>
<td>Node use (Cluster_Service); data source (Cluster_Node) archive</td>
</tr>
<tr>
<td>UI Row Levels</td>
<td>MenuScope</td>
<td>Equivalent Scope</td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Label</td>
<td>set archive</td>
</tr>
<tr>
<td>Node Disable</td>
<td>NodeDisable (cluster_service); dataSource (cluster_node) clear archive</td>
<td></td>
</tr>
<tr>
<td>Node Backup</td>
<td>NodeDisable (cluster_service); dataSource (cluster_node) backup</td>
<td></td>
</tr>
<tr>
<td>Node Promote</td>
<td>NodeDisable (cluster_service); switch to (cluster_node)</td>
<td></td>
</tr>
<tr>
<td>Node Fail</td>
<td>NodeDisable (cluster_service); dataSource (cluster_node) fail</td>
<td></td>
</tr>
<tr>
<td>Node Restore</td>
<td>NodeDisable (cluster_service); dataSource (cluster_node) restore</td>
<td></td>
</tr>
<tr>
<td>Node Enable</td>
<td>NodeDisable (cluster_service); dataSource (cluster_node) standby</td>
<td></td>
</tr>
<tr>
<td>Node Disable</td>
<td>NodeDisable (cluster_service); dataSource</td>
<td></td>
</tr>
<tr>
<td>UI Row Levels</td>
<td>MenuScope CTRL Label</td>
<td>Equivalent</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Online Node</td>
<td>(cluster_node)</td>
<td>clear standby</td>
</tr>
<tr>
<td>Online Node/Replicator</td>
<td>cluster_service</td>
<td>replica (cluster_node) online</td>
</tr>
<tr>
<td>Offline Node/Replicator</td>
<td>cluster_service</td>
<td>replica (cluster_node) of offline</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