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MySQL Cluster 7.3リリース記念！！ 5分で作るMySQL Cluster環境

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New! MySQL Cluster 7.3

New!!

Developer Power
Developer Simplicity



Learn More »

- 外部キー
- Connection Thread Scalability
- MySQL 5.6との統合
- Auto-Installer
- NoSQL API : JavaScript for node.js

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MySQL Cluster: Overview

読み込み/書き込み処理 に対する高い拡張性

- 自動シャーディング、マルチマスター
- ACID 準拠のトランザクション, OLTP + Real-Time Analytics

99.999% の高可用性

- シェアードキャッシング、単一障害点無し
- 自動修復 + オンラインオペレーション

リアルタイム

- インメモリデータベース + ディスクデータ
- 非常に低いレイテンシ、短いアクセス時間

SQL + NoSQL

- Key/Value + SQL の柔軟性
- SQL + Memcached + JavaScript + Java + JPA + HTTP/REST & C++

低い TCO

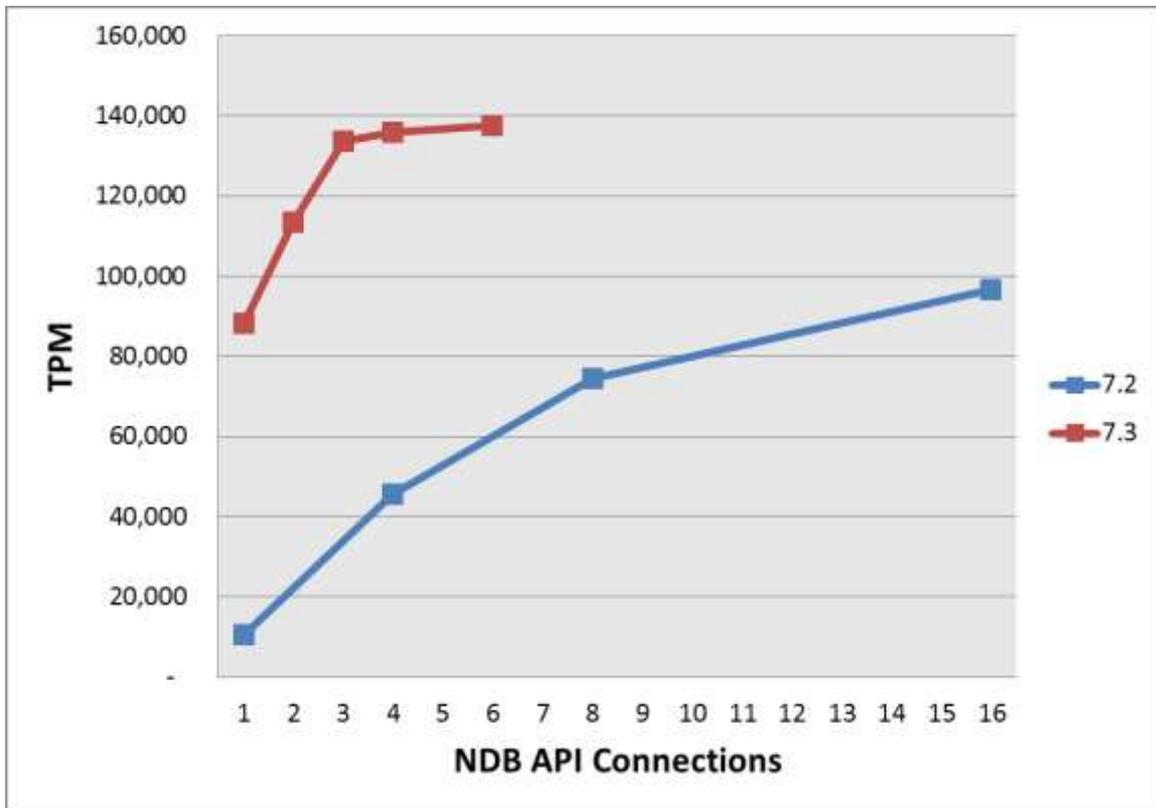
- オープンソース + 商用版
- コモディティハードウェア + 充実した管理ツール、監視ツール

Who's Using MySQL Cluster?



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MySQL Cluster Connection Thread Scalability



8.5x

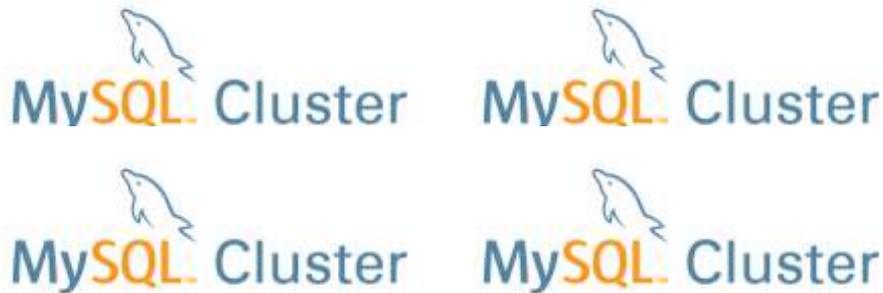
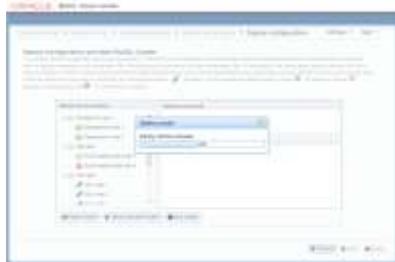
- DBT2 Benchmark
 - Single MySQL Server
 - Single Data Node
 - 128 client connections

MySQL Cluster 7.3: Auto-Installer

- 素早く設定可能
- リソースを自動検出
- ワークロードに合わせた最適化
- 再現可能なベストプラクティス
- MySQL Cluster 7.2 + 7.3 で使用可能



MySQL Cluster 7.3: Auto-Installer



MySQL Cluster Auto-Installer

- マルチホストサポート
- リモートサーバへもデプロイ可能
- 簡単に実行可能:
 - `bin/ndb_setup`
 - `setup.bat`

Auto-Installerを使って、MySQL Clusterのテスト環境を5分で作成してみよう

1. MySQL Cluster7.3をダウンロードする
2. Auto-Installerを起動して、各種設定を行う
3. Auto-InstallerからDeployする
4. 稼働確認

MySQL Cluster 7.3をダウンロードする

- <http://dev.mysql.com/downloads/cluster/> へアクセス
- 環境に応じたモジュールをダウンロード
 - 今回は、
Linux - Generic (glibc 2.5) (x86, 64-bit), Compressed TAR Archive
(mysql-cluster-gpl-7.3.2-linux-glibc2.5-x86_64.tar.gz)
をダウンロード

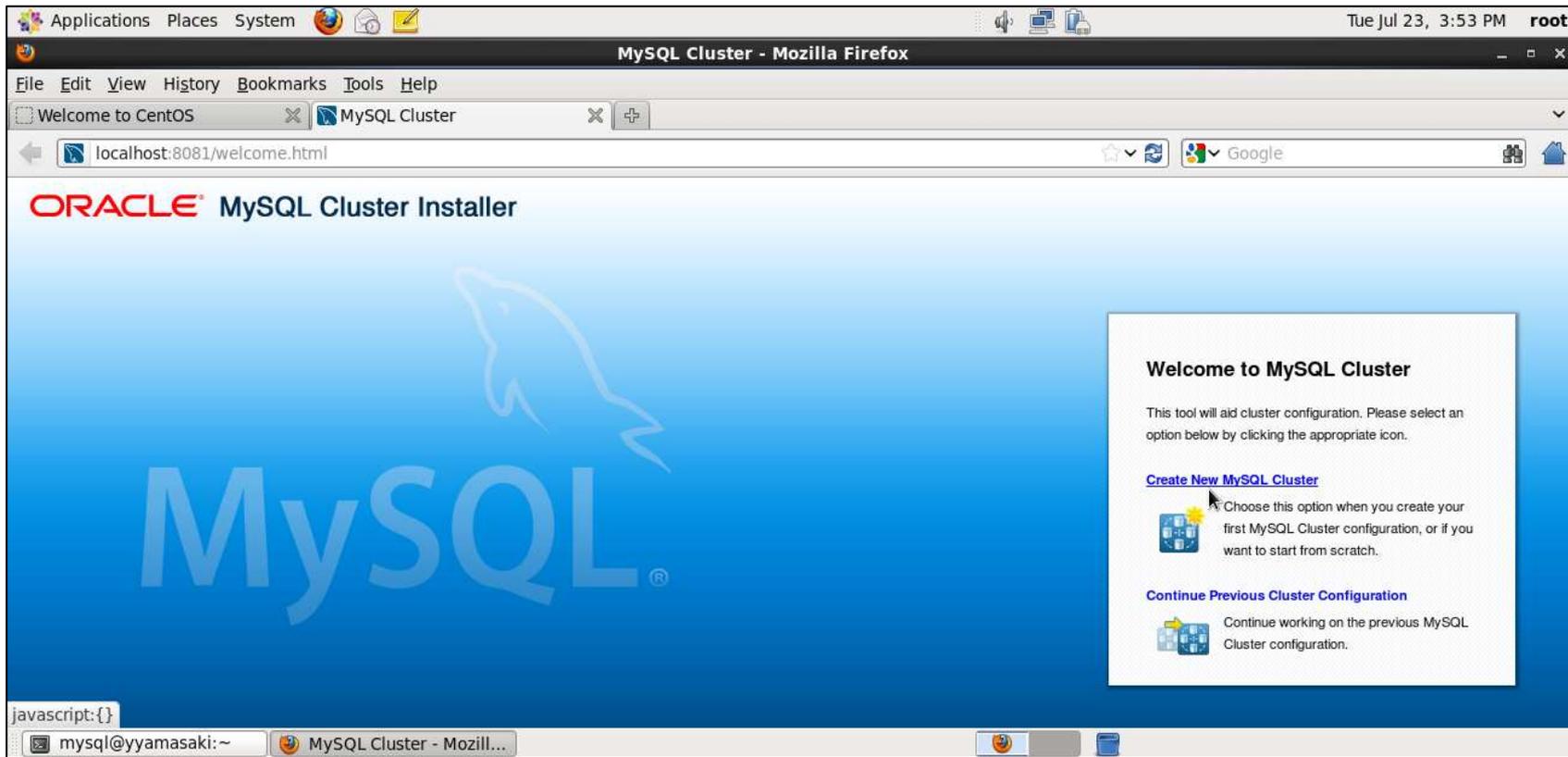
Auto-Installerを起動して、各種設定を行う

- TARファイルを解凍
 - `cd /usr/local`
 - `tar xvzf /<<ファイルパス>>/mysql-cluster-gpl-7.3.2-linux-glibc2.5-x86_64.tar.gz`
 - `mv mysql-cluster-gpl-7.3.2-linux-glibc2.5-x86_64 mysql-cluster`
- mysqlユーザ作成
 - `groupadd -g 502 mysql`
 - `useradd -u 502 -g mysql -d /home/mysql -s /bin/bash mysql`
- Auto-Installerを起動(mysqlユーザで実行)
 - `/usr/local/mysql-cluster/bin/ndb_setup.py`

Auto-Installerを起動して、各種設定を行う

- 「Create New MySQL Cluster」をクリック後、「Next」をクリックし続ける
 - 設定を変更したい場合は、設定を変更後、「Next」をクリック

Auto-Installerを起動して、各種設定を行う



Auto-Installerを起動して、各種設定を行う

The screenshot shows a Mozilla Firefox browser window displaying the MySQL Cluster Installer. The browser's address bar shows the URL `localhost:8081/content.html`. The page title is "ORACLE MySQL Cluster Installer". The navigation bar includes "Define cluster", "Define hosts", "Define processes", "Define parameters", and "Deploy configuration". The current step is "Cluster Type and SSH Credentials".

Cluster Type and SSH Credentials
MySQL Cluster is able to operate in various configurations. Please specify the settings below to define the right cluster type that fits your use case. If you intend to use remote hosts for deploying MySQL Cluster, SSH must be enabled. Unless key based SSH is possible, you must submit your user name and password below.

Cluster property	Value
Cluster name [?]	<input type="text" value="MyCluster"/>
Host list [?]	<input type="text" value="127.0.0.1"/>
Application area [?]	<input type="text" value="simple testing"/>
Write load [?]	<input type="text" value="medium"/>

Navigation buttons: Previous, Next, Finish

Auto-Installerを起動して、各種設定を行う

The screenshot shows the MySQL Cluster Installer web interface. The browser window title is "MySQL Cluster - Mozilla Firefox". The address bar shows "localhost:8081/content.html". The page title is "ORACLE MySQL Cluster Installer". The navigation bar includes "Define cluster", "Define hosts", "Define processes", "Define parameters", and "Deploy configuration". The "Define hosts" step is active.

Select and Edit Hosts

MySQL Cluster can be deployed on several hosts. Please select the desired hosts by pressing the *Add host* button below and enter a comma separated list of host names or ip addresses. Resource information is automatically retrieved from the added host if this is checked in the settings menu, and if the required SSH credentials have been submitted. When a host has been added, the corresponding information can be edited by double clicking a cell in the grid. If you want to apply the same changes to several hosts, multiple rows can be selected and the *Edit selected host(s)* button can be pressed, which shows a dialog where the editing can be done. Hosts can be deleted by selecting the corresponding rows in the table and pressing the *Remove selected host(s)* button. If a host is removed, processes configured to run on that host will also be removed from the configuration.

Host	Resource info	Platform	Memory (MB)	CPU cores	MySQL Cluster install directory	MySQL Cluster data directory
127.0.0.1	OK	Linux	996	1	/usr/local/mysql-cluster/	/home/mysql/MySQL_Cluster/

Buttons: **Add host**, **Remove selected host(s)**, **Edit selected host(s)**

Navigation: **Previous**, **Next**, **Finish**

Auto-Installerを起動して、各種設定を行う

The screenshot shows a Mozilla Firefox browser window titled "MySQL Cluster - Mozilla Firefox" with the address bar set to "localhost:8081/content.html". The page content is the "MySQL Cluster Installer" interface, which is currently on the "Define processes" step of a multi-step wizard. The breadcrumb navigation shows: "Define cluster > Define hosts > Define processes > Define parameters > Deploy configuration".

The main heading is "Define Processes and Cluster Topology". Below it, there is explanatory text: "Various processes may be part of a MySQL Cluster configuration. Please refer to the [MySQL Cluster Documentation](#) for a description of the different process types. If you have added hosts previously, a default configuration will be suggested the first time you enter this page. This configuration may be modified by moving processes between hosts by drag and drop, or by adding and removing processes. You may also go back to the previous page and add more hosts before editing the topology. The special entry labelled *Any host* in the tree below represents an arbitrary host. On this special tree entry, only *API* processes can be moved or added. These processes will not be required to run on a particular host, but may execute anywhere."

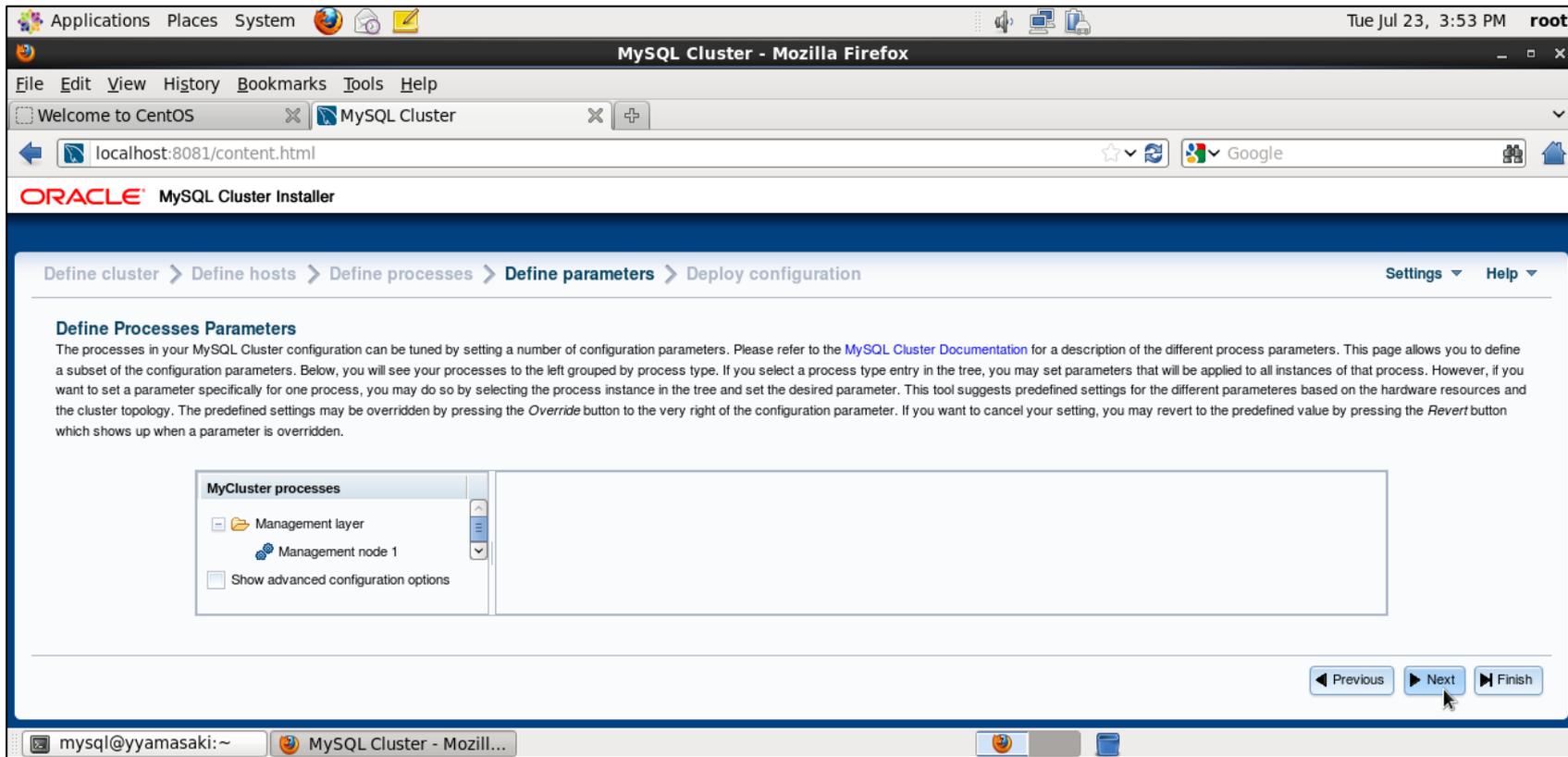
The "MyCluster topology" panel on the left shows a tree view with the following items:

- Any host (indicated by a star icon)
- 127.0.0.1 (indicated by a server icon)
- Management node 1 (indicated by a gear icon)

Below the tree view are two buttons: "+ Add process" and "- Delete process".

At the bottom right of the page, there are three navigation buttons: "Previous", "Next", and "Finish". The "Next" button is highlighted with a mouse cursor.

Auto-Installerを起動して、各種設定を行う



The screenshot shows a web browser window titled "MySQL Cluster - Mozilla Firefox" displaying the "MySQL Cluster Installer" interface. The browser's address bar shows "localhost:8081/content.html". The installer interface has a navigation breadcrumb: "Define cluster > Define hosts > Define processes > Define parameters > Deploy configuration". The current step is "Define Processes Parameters".

Define Processes Parameters

The processes in your MySQL Cluster configuration can be tuned by setting a number of configuration parameters. Please refer to the [MySQL Cluster Documentation](#) for a description of the different process parameters. This page allows you to define a subset of the configuration parameters. Below, you will see your processes to the left grouped by process type. If you select a process type entry in the tree, you may set parameters that will be applied to all instances of that process. However, if you want to set a parameter specifically for one process, you may do so by selecting the process instance in the tree and set the desired parameter. This tool suggests predefined settings for the different parameters based on the hardware resources and the cluster topology. The predefined settings may be overridden by pressing the *Override* button to the very right of the configuration parameter. If you want to cancel your setting, you may revert to the predefined value by pressing the *Revert* button which shows up when a parameter is overridden.

MyCluster processes

- Management layer
 - Management node 1
- Show advanced configuration options

At the bottom right of the interface, there are three buttons: "Previous", "Next", and "Finish". The "Next" button is highlighted with a mouse cursor.

Auto-Installerを起動して、各種設定を行う

The screenshot shows a Mozilla Firefox browser window titled "MySQL Cluster - Mozilla Firefox" with the address bar set to "localhost:8081/content.html". The page displays the "ORACLE MySQL Cluster Installer" interface. The navigation breadcrumb is "Define cluster > Define hosts > Define processes > Define parameters > Deploy configuration". The main heading is "Deploy Configuration and start MySQL Cluster". Below this, a paragraph explains that the MySQL Cluster configuration can be reviewed, and it lists the processes defined, ordered by their startup sequence. It also provides instructions on how to start the cluster and what the status icons represent. The interface includes a tree view on the left showing "MyCluster processes" with "Management layer" and "Data layer" expanded. The "Management layer" contains "Management node 1". The "Data layer" is currently empty. Below the tree view are three buttons: "Deploy cluster", "Deploy and start cluster", and "Stop cluster". At the bottom right, there are "Previous", "Next", and "Finish" navigation buttons. The browser's taskbar at the bottom shows the user is logged in as "mysql@yyamasaki:~".

Auto-InstallerからDeployする

- 「Deploy and start cluster」をクリック

Auto-InstallerからDeployする

The screenshot shows a Mozilla Firefox browser window titled "MySQL Cluster - Mozilla Firefox" displaying the Oracle MySQL Cluster Installer. The browser's address bar shows "localhost:8081/content.html". The installer interface has a navigation breadcrumb: "Define cluster > Define hosts > Define processes > Define parameters > Deploy configuration". The main heading is "Deploy Configuration and start MySQL Cluster". Below the heading, there is a paragraph of instructions: "Your MySQL Cluster configuration can be reviewed below. To the left are the processes you have defined, ordered by their startup sequence. Please select a process to view its startup command(s) and configuration file. Note that some processes do not have configuration files. At the bottom of the center panel, there are buttons to Deploy, Start and Stop your cluster. Please note that starting the cluster may take up to several minutes depending on the configuration you have defined. In the process tree, the icons reflect the status of the process as reported by the management daemon: : unknown or if the management daemon does not reply, : connected or started, : starting or shutting down, and : not connected or stopped." Below this text is a panel with a tree view on the left and a details view on the right. The tree view shows "MyCluster processes" with "Management layer" (containing "Management node 1") and "Data layer". The details view shows "Startup command" and "Configuration file" fields. At the bottom of the panel are three buttons: "Deploy cluster", "Deploy and start cluster", and "Stop cluster". The "Deploy and start cluster" button is highlighted with a mouse cursor. At the bottom right of the installer interface are "Previous", "Next", and "Finish" buttons. The browser's taskbar at the bottom shows the terminal window "mysql@yyamasaki: ~" and the browser window "MySQL Cluster - Mozill...".

Auto-InstallerからDeployする

Applications Places System Tue Jul 23, 3:53 PM root

MySQL Cluster - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Welcome to CentOS MySQL Cluster

localhost:8081/content.html Google

ORACLE MySQL Cluster Installer

Define cluster > Define hosts > Define processes > Define parameters > Deploy configuration Settings Help

Deploy Configuration and start MySQL Cluster

Your MySQL Cluster configuration can be reviewed below. To the left are the processes you have defined, ordered by their startup sequence. Please select a process to view its startup command(s) and configuration file. Note that some processes do not have configuration files. At the bottom of the center panel, there are buttons to *Deploy*, *Start* and *Stop* your cluster. Please note that starting the cluster may take up to several minutes depending on the configuration you have defined. In the process tree, the icons reflect the status of the process as reported by the management daemon: : unknown or if the management daemon does not reply, : connected or started, : starting or shutting down, and : not connected or stopped.

MyCluster processes

- Management layer
 - Management node 1
- Data layer

Starting cluster

Starting Cluster processes

Configuration 20%

Deploy cluster Deploy and start cluster Stop cluster

Previous Next Finish

mysql@yyamasaki: ~ MySQL Cluster - Mozill...

Auto-InstallerからDeployする

The screenshot shows the MySQL Cluster Installer web interface. The browser window title is "MySQL Cluster - Mozilla Firefox". The address bar shows "localhost:8081/content.html". The page title is "ORACLE MySQL Cluster Installer". The main content area shows a progress bar for "Deploy configuration" and a "Starting cluster" dialog box with a progress bar at 60%.

Define cluster > Define hosts > Define processes > Define parameters > Deploy configuration

Deploy Configuration and start MySQL Cluster

Your MySQL Cluster configuration can be reviewed below. To the left are the processes you have defined, ordered by their startup sequence. Please select a process to view its startup command(s) and configuration file. Note that some processes do not have configuration files. At the bottom of the center panel, there are buttons to *Deploy*, *Start* and *Stop* your cluster. Please note that starting the cluster may take up to several minutes depending on the configuration you have defined. In the process tree, the icons reflect the status of the process as reported by the management daemon: : unknown or if the management daemon does not reply, : connected or started, : starting or shutting down, and : not connected or stopped.

MyCluster processes

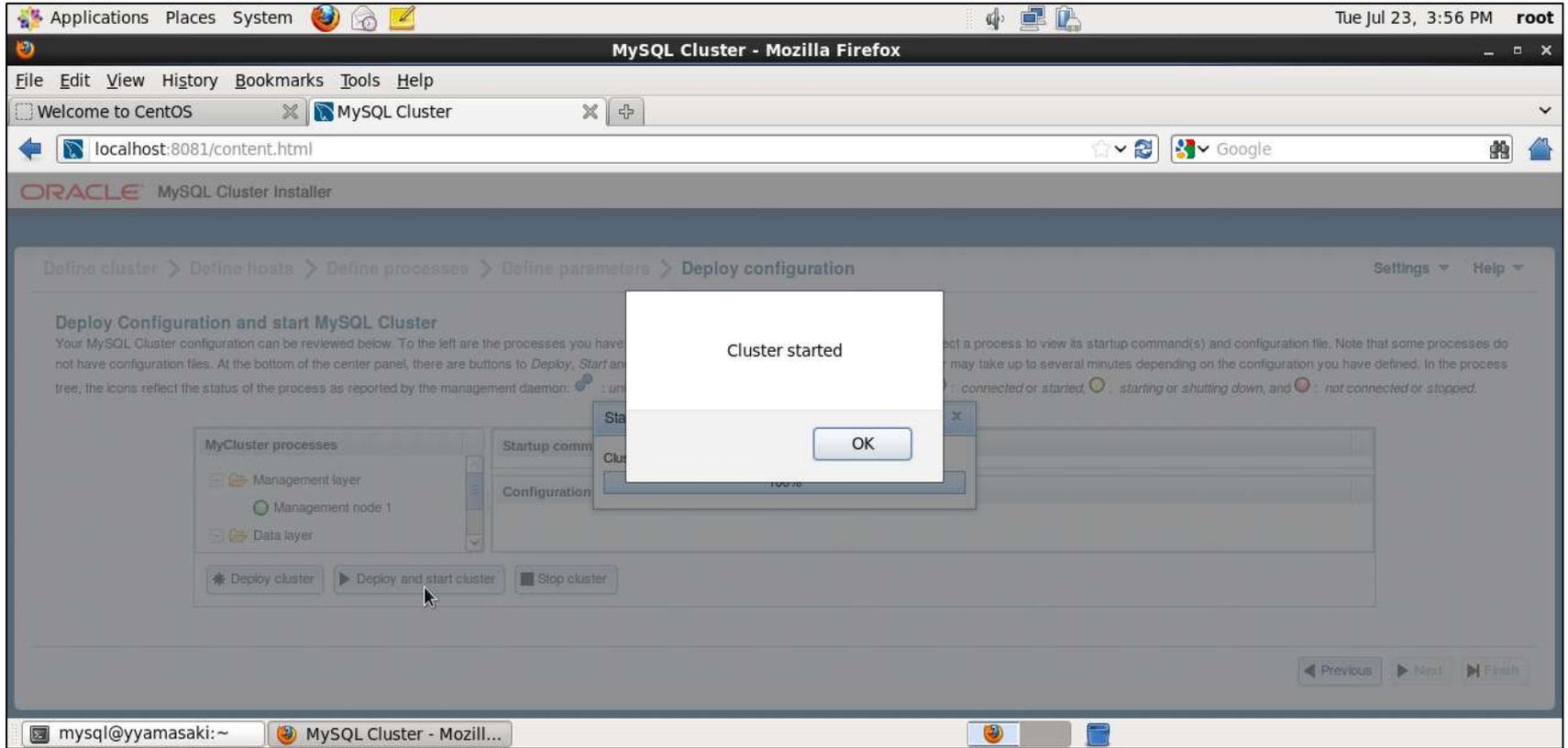
- Management layer
 - Management node 1
- Data layer

Buttons:

Starting cluster dialog box: Starting SQL install processes, Configuration: 60%

Navigation:

Auto-InstallerからDeployする



稼働確認

- SQLノード1に接続
 - `mysql -u root --port=3306 --socket=/home/mysql/MySQL_Cluster/53/mysql.socket`
- SQLノード2に接続
 - `mysql -u root --port=3307 --socket=/home/mysql/MySQL_Cluster/54/mysql.socket`

稼働確認

- SQLノード1から実行

- InnoDBとNDBでテーブルを作成し、データをinsert

- use test;
 - create table t_ndb (id int auto_increment, col1 char(20), primary key(id)) **engine=ndb**;
 - create table t_innodb (id int auto_increment, col1 char(20), primary key(id)) engine=innodb;
 - insert into t_innodb(col1) values('InnoDB');
 - insert into t_ndb(col1) values('NDB');

- データを確認

- show tables;
 - select * from t_innodb;
 - select * from t_ndb;

稼働確認

- SQLノード2から実行
 - データを確認(NDBのテーブルのみが確認できる)
 - use test;
 - show tables;
 - select * from t_innodb;
 - select * from t_ndb;
 - NDBのテーブルにデータをinsert
 - insert into t_ndb(col1) values('NDB_Node2');
 - データを確認
 - select * from t_ndb;

稼働確認

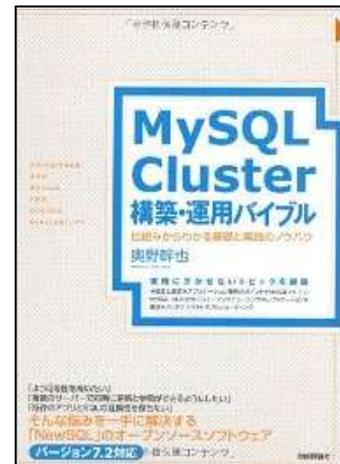
- SQLノード1から実行
 - データを確認(SQLノード2から INSERT したデータも確認できる)
 - `select * from t_ndb;`

テスト環境はできたので、 後は奥野さんの本を片手に MySQL Clusterを触りましょう！！ (<http://gihyo.jp/book/>にて、電子書籍版もあり)

※各種パラメータは、必要に応じて変更しましょう。

特に、以下の設定は、すぐに容量不足になりデータを挿入できなくなるので要注意！！

- DataMemory=1M
- IndexMemory=1M



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Hardware and Software Engineered to Work Together

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